

# THE IRON AGE

THURSDAY, NOVEMBER 6, 1902.

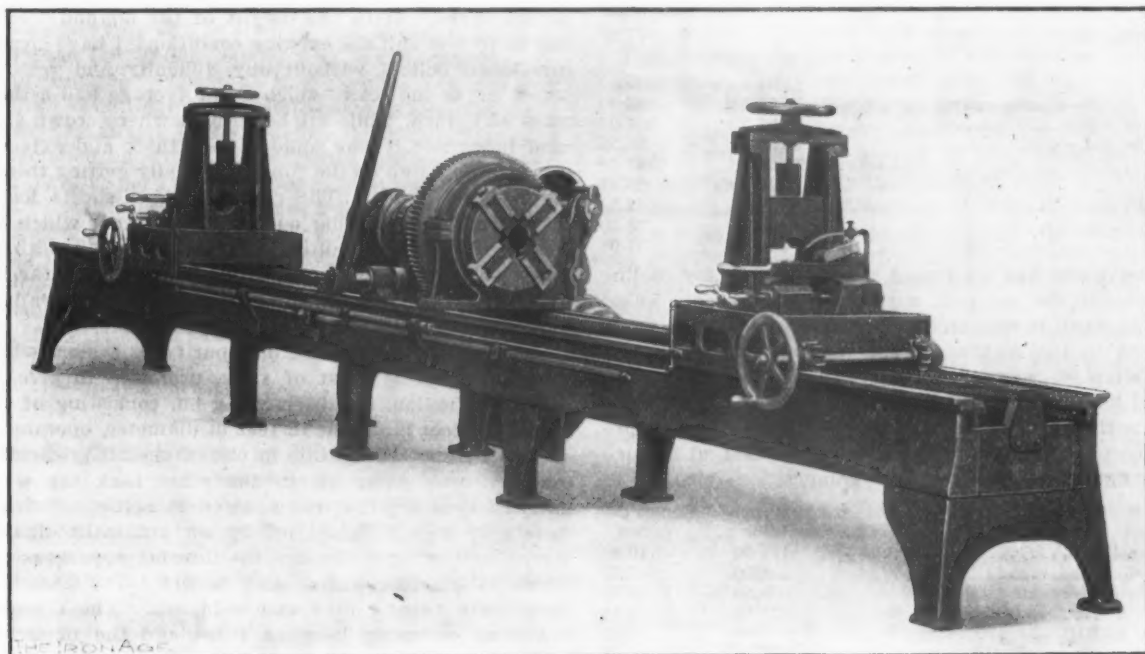
## The Bignall & Keeler Double Tool Cutting Off Machine.

The double end, double tool cutting off machine built by the Bignall & Keeler Mfg. Company of Edwardsville, Ill., is designed to cut off boiler tubes from 2 to 5 inches in diameter and from 8 to 20 feet in length. The bed is provided with two movable carriages, each being equipped with a heavy steady rest, cutting off tools, and reaming lever, and the steady rests having interchangeable blocks which are babbitted for the several different sizes of tubes. Thus they hold the tube firmly around the greater part of its circumference and provide almost perfect rests.

The head stock is built with a lever chuck which is operated while the machine is in motion; in other words, after the grips in the chuck have been set for a certain size of tube the machine can be run continuously while

nominal rating of the machinery now installed is 139,100 horse-power in the engines, with 96,500-kw. in the generators. The maximum load which these stations can carry, as they now stand, is for the engines 205,000 horse-power and for the generators 136,700 kw. In addition there is already projected 173,600 horse-power, nominal rating, for two new stations and to supplement that now in use. This makes a total for the immediate future of 312,700 horse-power, nominal rating. The output of the two power stations now operating at Niagara Falls is 80,000 horse-power.—*Electrical Review.*

**Recording Thermometer.**—The Helios-Upton Company, Peabody, Mass., manufacturers of arc lamps, thermometers, switchboards, storage batteries, steam traps, &c., have lately added to their line a recording thermometer which is artistic in design and has a range of 140 degrees. It can be furnished either with daily or week-



THE BIGNALL & KEELER DOUBLE TOOL CUTTING OFF MACHINE.

working on that one size of tube, and as the machine is run for a day or several days on the same size of work the lever chuck accomplishes a great saving in time.

A separate set of grips is used for each size of tube. These are made of tool steel, tempered, and are turned to the exact outside diameter of the tube. The inside of the grip is left perfectly smooth and they hold the tube by friction only, but as they grip the tube around almost its entire circumference there is no likelihood of its slipping.

The machine is equipped with a 3 horse-power Westinghouse induction motor, which is held on a swinging table hinged to the side of the bed. The motor is geared into a countershaft supported on this same table. A short belt is run between the countershaft cone and the machine cone. The weight of the motor and the countershaft provide the necessary tension. The machine is provided with an automatic oiling system which keeps the cutting off tools of both carriages continuously supplied with oil.

**The Kilowatt Capacity and Horse-Power of a Great City.**—Probably few realize the size of the three large power stations operating in New York City. The total

ly dial. It is made on the interchangeable system, so that its parts can be duplicated at a small expense. It is suitable for schools, public buildings, private residences and for any place where a record of temperature is deemed necessary. It is referred to as absolutely dust proof. The thermometer is furnished in any style of finish, such as nickel, bronze, copper, silver, &c.

**The Union Spring & Mfg. Company.**—The Union Spring & Mfg. Company, recently organized at Pittsburgh, will locate their new plant at New Kensington, Pa., on the Allegheny Valley Railroad, about 20 miles from Pittsburgh. The company have bought the site and plant of the Hussey Steel Company, at New Kensington, part of which will be equipped for the manufacture of railway steel springs. Albert Pancoast, formerly of the Railway Spring & Mfg. Company, at Washington, Pa., recently taken over by the American Railway Spring Company, is at the head of the new interest, the capital stock of which has been increased to \$200,000. The plant at New Kensington acquired by the new concern comprises four buildings and has been used for the manufacture of steel sheets, for deep stamping and deep drawing. It is fully equipped, containing a

machine shop, four annealing furnaces, two 5-ton Siemens air furnaces, one 10-inch, one 16-inch and one 18-inch cold roll trains. The new company will not operate the rolling mill, for a time at least, and will remove the cold mills to accommodate the spring plant. Special machinery, which has been ordered for some time, is about ready for shipment. The plant will be ready for operation by December 1 and will provide an output of 500 tons per month. Eventually the company will manufacture all kinds of springs and may equip one of the buildings for general forging work.

### Difficulties in a Steel Mill Caused by Bad Feed Water.

BY A. OSGYANI.

Water of the most undesirable quality for boiler uses, practically no provisions for purifying it, and boilers which were as undesirable for this kind of water as they were excellent steamers, were three reasons which caused no end of trouble in the plant of the New York Steel & Wire Company at Astoria, Long Island.

It would seem that the bad quality of the water was known before the mill was started up in May, 1900, for previous to this date attempts to find water on the company's property were made, which resulted in sinking a well 45 feet deep, giving water of the following composition:

	Parts per million.	Grains per gallon.
Total solids.....	5,703.5	332.60
Mineral solids.....	4,407.5	257.04
Volatile and organic matter.....	1,296.0	75.58
NaCl .....	3,388.26	197.69
KCl .....	425.60	24.83
MgCl <sub>2</sub> .....	729.30	42.53
CaCO <sub>3</sub> .....	490.20	28.59
CaSO <sub>4</sub> .....	532.80	31.08

This water has been used to some extent for cooling purposes in the rod mill, with the most injurious effect to rolls, until it was given up entirely, and it has never entered in the making up of the feed water supply. The simplest way of getting out of these difficulties would have been to lay pipes for a few blocks and connect with the Gleason Water Company's mains (a private corporation), which could have supplied, at a much lower figure, water of excellent composition—viz.:

	Parts per million.	Grains per gallon.
Total solids.....	179.00	10.44
Mineral solids.....	125.50	7.32
Volatile and organic matter.....	53.50	3.12
SiO <sub>2</sub> .....	22.50	1.31
(Fe <sub>2</sub> + Al <sub>2</sub> )O <sub>3</sub> .....	0.60	0.03
MgCl <sub>2</sub> .....	13.42	0.78
MeCO <sub>3</sub> .....	19.92	1.16
CaSO <sub>4</sub> .....	16.38	0.95
CaCO <sub>3</sub> .....	57.91	3.38

This, however, was met with the most stubborn refusal on the part of those who carried at heart the interest of the community, even to the extent of treating them to a water holding in solution some 50 grains per gallon of solid rock, as per analysis:

	Grains per gallon.
Silica .....	1.40
Fe <sub>2</sub> O <sub>3</sub> .....	0.40
CaCO <sub>3</sub> .....	8.09
MgCl <sub>2</sub> .....	6.94
CaSO <sub>4</sub> .....	5.75
MgSO <sub>4</sub> .....	6.44
NaCl .....	28.73
	57.75

These figures, however, in exceptional cases are almost to be doubled, depending on which pumping station was supplying the precious liquid.

To purify this water an open heater of insignificant size has been built, and although the intention probably was that this will purify the water, to show how harmless this arrangement was so far as depriving the water of its impurities goes, one has to think only of the fact that when later a similar open heater of a larger size, 8 x 8 x 8 feet, has been used additionally, it resulted in removing only 15 per cent. of the impurities

under the most favorable conditions with the aid of soda ash introduced in the heater.

This water, passing through that little heater (the large one has not been connected up for a year after the mill started) entered the boilers. These consist of three Manning boilers of 1000 horse-power each, with 500 2½ inch by 20 feet tubes, expanded at the fire end through the crown sheet, having a diameter of 8 feet, leaving about an inch space between most tubes, the only way to get at these being through a few hand holes.

The natural consequence of these conditions was that seven months after starting up the company had to shut down, the boilers being scaled up to such an extent that to run them any longer without removing the scale was considered too risky. As chemist of the concern I have tried various substances in view of using the one best suited for breaking up the scale without injuring the iron, likewise trying the action of a number of boiler compounds which were supposed to do wonderful work—in one case even the removal of salt from water—with the result that they either did not act on the scale or they acted on the steel also. During these experiments I succeeded in finding one chemical, never used for this purpose to my knowledge, which answered my purpose in every respect and which was actually charged in boilers after convincing the company that the substance is harmless as far as steel is concerned. With the details of the method worked out as to best suit the existing conditions, I have cleaned the three boilers without any difficulty and removed every bit of the scale, which at an average had a thickness of ¼ inch, while at the corners where crown sheet and tubes met it was some ½ inch thick and extended several inches up on the tubes, gradually getting thinner as it crept higher. The cleaned crown sheets looked like new after washing out the loose scale, which has assumed a pulpy condition and was removed with the greatest of ease. The cost of cleaning was by far less than it would have been by any other method available under the conditions and required less time.

Meanwhile the building of a purifying system which, from a chemical point of view, promised to give the best satisfaction, has been going on, consisting of two tanks, 13 feet high and 12 feet in diameter, operated in such a manner that while in one of them the chemical reaction was going on, in the other tank the water already thus treated was allowed to settle sufficiently before it was siphoned off by an automatic floating device and pumped through the filtering apparatus previous to entering heater and boilers. The chemicals used were caustic lime and soda ash. The chemical reactions occurring between these and the impurities in water are too well known to be discussed here.

For almost two years this system worked to best satisfaction, and as it treated a known quantity of water of a known composition, by proper care the impurities can be removed to a very reasonable extent. Owing to the fact that the quality of raw water changed according to which pumping station it came from, and as very often rain water was mixed with city water in the treating tanks, it was not without considerable work in the laboratory that the purified water was kept at such a good standard of quality that in no case has the amount of impurities thus removed been less than 85 per cent. The average quantity of water used for boilers was four to five tanks full in 24 hours, and every tankful of water was tested in laboratory.

With a purifying system controlled to such a delicate degree, the feed water, aided by two Wheeler surface condensers, naturally ceased to give trouble, and what little scale still formed was caused by concentration in the boiler, due to the fact that it has been found impractical to blow off as many times as was desired.

The following tables show distinctly the changes the water went through:

Raw (City) Water.		
	Parts per million.	Grains per gallon.
CaO .....	95.20	5.55
MgO .....	57.04	3.33
Cl .....	217.00	12.65



<i>Treated Water (Filtered).</i>		
CaO .....	14.00	0.82
MgO .....	3.91	0.23
Cl .....	218.00	12.71
<i>Treated Water Mixed with Condensed Water Just Before Entering Boilers.</i>		
CaO .....	9.20	0.54
MgO .....	2.75	0.16
Cl .....	146.00	8.51
<i>Water Taken Out of Boilers.</i>		
CaO .....	59.20	3.45
MgO .....	2.90	0.17
Cl .....	1,696.00	98.88

We see from these figures that, while by chemical treatment 85.29 per cent. lime and 93.14 per cent. magnesia salts were removed, the feed water was still purer, owing to the fact that 33 per cent. of it was condensed water, as shown by the difference in Cl between 218 and 146, and contained only 9.67 per cent. of the original amount of lime and 4.83 per cent. of the magnesia present in the raw water; in other words, by chemical treatment and dilution with condensed water 90.33 per cent. lime and 95.17 per cent. magnesia salt were removed. The chlorine in the last table compared with that in the previous one indicates to what extent the concentration progressed in boiler, and that the lime found in solution in the last table has not increased in proportion with the chlorine shows that the missing portion has precipitated out in the boiler and thus entered in the composition of the scale, leaving still in solution almost seven times as much lime per gallon as the feed water entering the boilers contained. Large as this amount is it indicates improved conditions when compared with analyses made on water taken out of boiler before the purifying system was installed, showing 548.8 parts per million, equivalent to 31.99 grains per gallon of lime in solution.

At present the company are systematically sinking wells with results which justify their hopes of soon obtaining the necessary quantity to supply the mill when in full blast, and although it is not likely that the quality will be better than that of the best water in this neighborhood, still it is only the question of properly adjusting the amount of chemicals required that it will be a feed water of desirable quality.

### Gas Engines Driven by Blast Furnace Gas.

An eminent engineer connected with one of the large corporations in the iron trade had occasion to visit the Düsseldorf Exhibition, and while in Germany investigated the all absorbing question of the use of blast furnace gas for power in engines. We are permitted to quote from it the following:

One of the most astonishing things in Germany is the point to which they have developed the gas engine, and especially engines running from blast furnace gas. At Differdingen can be seen blast furnaces having the blast supplied by blowing engine cylinders direct connected to gas engine cylinders. These are in units of 800 horse-power each, and gas engine units may also be seen of 800 and 1000 horse-power direct connected to dynamos, so that where there are no steel works in connection with the blast furnace no steam boilers would be necessary. All this has been made possible by being able to clean the blast furnace gas, the centrifugal principle being used. Water is mixed with the gas; the water and dust thus being separated out by an ordinary centrifugal fan. The gas before going through the fan carries 2.2 to 2.5 grains troy per cubic foot, and afterward carries 0.175 grains per cubic foot. The gas mixed with water then goes through the scrubbers, which look like small blast furnace stoves and contain different material, often water and wood fiber. The scrubbers remove a portion further of the dust, for after leaving them the gas contains 0.044 grains troy per cubic foot. A small jet burning shows by its color and appearance whether the gas is being properly cleaned. They use 0.03 to 0.06 gallons of water per cubic foot of gas. The gas contains 100 to 120 B. T. U.

Not only here, but several other plants are running in Germany to-day where blast furnace gas is used in gas engines. An idea of the size may be had from the following, which was a machine of the Oechselhauser sys-

tem: The working cylinder was 30½ inches in diameter; blowing cylinder, 72½ inches in diameter; stroke of both being 37½ inches. The engine is capable of compressing 17.662 cubic feet of air per minute to a pressure of 7.7 pounds per square inch when working at 100 revolutions per minute. The engine indicated 800 horse-power. This engine has two pistons in the same cylinder, always moving in opposite directions, and actuated by cranks 180 degrees apart on the same engine shaft. The pistons compress the mixture of gas and air between them, two pistons making it possible to have exhaust, air and gas ports open at the proper time, the pistons simply sliding by their own ports and giving an explosion each revolution of the engine shaft.

At several plants I tried to obtain an expression of opinion as to which system and make of gas engine they preferred, but did not find any one particular system recommended. In most cases the users said they had not used the different systems side by side long enough to give any answer. However, several different systems have been working with satisfaction on blast furnace gas for some three or more years in Germany, and it seems likely that America will soon follow the lead, for the Southwark Foundry & Machine Company of Philadelphia are now making 16 air tubs of 76 inches in diameter, 60-inch stroke, to run at 80 revolutions, pumping about 28,000 cubic feet of free air per minute to 30 pounds per square inch, all of which are to be connected to gas engines of the Korting system. Two units of 1000 horse-power each will be connected to each air tub, making 32,000 horse-power of gas engines. These engines are being built by the De La Vergne Refrigerating Company of New York, and the whole will be installed at the plant now being built by the Lackawanna Steel Company at Buffalo, N. Y.

The exhaust from large gas engines often makes a loud troublesome noise, and at one plant a small stream of water was thrown into the exhaust pipe, which immediately became steam, taking the energy and heat that were left in the exhaust gases and completely stopping the noise. A volume of steam was blown into the atmosphere, that looked as if it were the exhaust pipe of a noncondensing steam engine instead of a gas engine. I believe this is common practice on smaller engines, but wish to say that it was most efficacious on these 1000 horse-power units.

I was told by some of the engineers where large gas engines were running on blast furnace gas that 105 to 125 cubic feet of blast furnace gas were used per horse-power per hour, and that 6½ gallons of water per horse-power per hour were used for cooling the cylinders.

Under variable load there seemed to be no difficulty in the various makes of gas engines to take care of it; and as to the economy I was unable to obtain any figures bearing directly on this point, but the economy of the whole installation, as will be seen from the quantity of gas used, would not only take care of this, but would pay to clean the gas many times over if necessary, as I understand some of our American blast furnace gas carries more dust than the German.

**The Lebanon Chain Works.**—The Lebanon Chain Works, at Lebanon, Pa., are rushed with orders on Government contracts for light vessels and buoy chains, which, with recent orders for large cable chain to equip vessels Nos. 7 and 8 for the New York Shipbuilding Company, and the completing of the 33-16-inch diameter stud link chain for the two mammoth vessels now under construction at the yards of the Eastern Shipbuilding Company, for the Great Northern Railway, to be used in trade with the Orient, have kept their plant running to its utmost capacity. Owing to an invention of the president and general manager, Eli Attwood, of a link bending machine, they are now in position to make any size stud link chain that can be used by the trade, in large quantities and with prompt dispatch, without any interference in the catering to their large trade for dredge, crane and block chains. Within the last year they have replaced their 300,000-pound testing machine with a 600,000-pound machine, which enables them to test the largest cables. The iron used in the

manufacture of the different grades is all of a special mix of Mr. Attwood's, who holds the record on a 2-inch light vessel chain, of charcoal mixture, which test was made by the Government inspector on a 300,000-pound testing machine. It was pulled to the capacity of the machine and did not break, whereas the breaking strain required by the Government is 250,000 pounds.

### Motor Driven Automatic Threading Lathe.

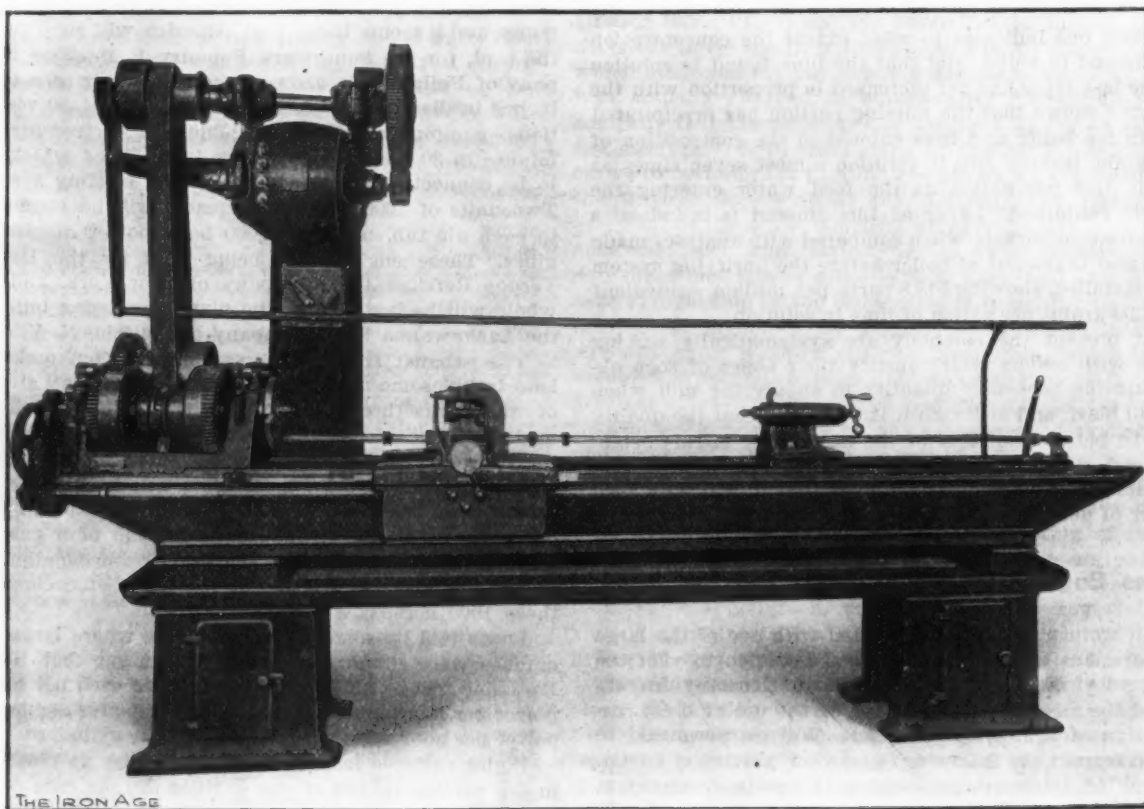
The automatic threading lathe built by the Automatic Machine Company of Bridgeport, Conn., was fully described and illustrated in our issue of May 1 last. The tool is particularly intended for the accurate threading of screws and worms and is entirely automatic in its action. It has now been provided with a motor drive, the arrangement of which is clearly shown in the engraving. The motor and counter are carried by brackets secured to the bed just to the rear of the head stock.

But this could have been got over, for if I could have got what I wanted, I should not have objected to pay rather more for the English wind mill. As a rule it is superior in make."

"Then what was the difficulty?"

"When I told the maker that I must have galvanized iron tanks with these mills his reply was that he never made them. I said that this was a necessity on account of our climatic conditions. The only offer I could get from him was that if I would guarantee him a certain number of orders during a certain period he would entertain any proposal I might have to make. I told him that it was not for me to give any such guarantee, as I could get what would answer my purpose elsewhere without any such stipulation. And so I buy my wind mills in America."

✓ **The Pittsburgh Steamship Company.**—We are officially advised that the Pittsburgh Steamship Company, an



MOTOR DRIVEN AUTOMATIC THREADING LATHE.

The starting box is placed on one of the brackets under the motor and within convenient reach.

### The English and the American Way.

The following interview will be appreciated as coming from the *Engineer* of London in a series of articles on "South Africa from an Engineer's Point of View":

Let me quote a characteristic example of the manner in which we lose business here. A large importer told me the other day that year in and year out he sold a wind mill every day. These plants are required by farmers for private irrigation purposes and domestic water supply. The importer took me to his stores, and there I saw quantities of American wind mills with their tanks and accessories. There was nothing from England.

"Why do you not buy these things in England?" I asked.

"I went to England on purpose to make arrangements a year or two ago," he replied; "but although I found plenty of good wind mills it was impossible to do business."

"Why so?"

"Firstly, of course, there was the question of price.

identified interest of the United States Steel Corporation, have invited tenders for the building of 20 steel ore boats of 9000 tons carrying capacity each. It is understood that the United States Steel Corporation have decided to materially increase the fleet of vessels owned by the Pittsburgh Steamship Company, in order to insure ample carrying capacity of ore for next year, which will be very much larger on account of the new blast furnaces being built by identified interests. It is probable most of these new boats will be built by the American Ship Building Company. According to the plans proposed, the vessels of the new fleet, each of the highest type of modern lake steamship, will have the following dimensions: Keel, 550 feet; beam, 58 feet; depth of hold, 30 feet. On a mean draft of 18 feet of water they will carry 9000 tons. The Pittsburgh Steamship Company, who were formerly operated by the Carnegie Steel Company, now control all of the lake vessels of the steel corporation. They operate in all 112 vessels, 69 of which are steamships and whalebacks and 43 barges, the total carrying capacity being 9,448,600 tons of iron ore per year, based on an average of 19 trips each season. D. M. Clemson is president of the Pittsburgh Steamship Company.



## Scientific-Technical Notes.

The latest fire resisting material to claim the attention of scientists and engineers is known as urallite, because of the fact that its inventor, an officer of the Russian army, was stationed near the Ural Mountains, and a part of its substance, the asbestos, comes from that quarter of the world. The asbestos is ground to pulp and mixed with about 30 per cent. of chalk, to fill up the interstices between the short fibers, and, after passing through various chemical processes, appears in the form of tough, pliable strips. Gelatinous silica is used as a cementing substance, about 20 per cent. being used, thus leaving the proportion of asbestos about one-half of the total. The boards made from this substance are tough and will stand a large amount of wear and tear, but their chief interest arises from the fact that they appear to be utterly impervious to fire. They may be planed or sawed like ordinary wood, and glued or nailed with equal facility. Numerous experiments have been made with this urallite, all intended to demonstrate its superior qualities as a fire resistant, and all appear to have been successful. Doors made of it have withstood extreme temperatures without injury, and a deed box was subjected to a very hot fire for an hour and a half; when opened, it was found that the papers were not even charred. As a material for constructing file boxes and in various other ways where papers are to be preserved, it should have a large field of usefulness. Its application on shipboard is another important field.

A curious fact to be noted at the present time is the lack of analogy between our practice in steam engines and that in ordnance. While with the former our pressures are continually increasing and the steam is used with higher and higher ratios of expansion, we are moving in the other field in direct opposition to this evolution obtaining in the steam engine. We are using guns, or, rather, the powder in the gun, nonexpansively; neither are we materially raising the pressures used in the guns.

In discussing the relations existing between macadam roads and electric street railroads, including in the latter term all so-called interurban roads, a recent writer pointed out that both were having a decided influence on population figures for the rural districts. Of the 59 counties in New York State 22 had a smaller population in 1900 than in 1890, the figures being 875,560 for 1890 and 845,294 for 1900, a loss of 30,266, or 3.5 per cent. In six of the counties mentioned this loss ranged from 7 to 9 per cent. It was particularly noted that every county on the east bank of the Hudson, with the exception of Rensselaer and Dutchess, was so affected. The true interurban road, however, is more a product of the last three or four years than of the period under consideration. It may be that, when its influence becomes more thoroughly appreciable, the result will be to oppose somewhat the present influx to the large cities.

The works of the De Laval Steam Turbine Company, at Trenton, N. J., are driven by electricity generated by dynamos direct connected to De Laval steam turbines. Babcock & Wilcox boilers, fitted with superheaters, supply the steam. A recent test was made of one of the 300 horse-power turbines at various loads and with both superheated and saturated steam. With steam superheated 84 degrees F. the consumption per brake horse-power hour was 13.94 pounds on a load of 352 B. H. P. With saturated steam at 333 B. H. P. 15.17 pounds were required. This shows a saving of 8.8 per cent. for the superheated steam. By reducing the number of nozzles in operation from eight to seven, and superheating the steam to 65 degrees F., a consumption of 14.35 pounds with a load of 298 B. H. P. was observed. Using saturated steam under these conditions and a load of 285 B. H. P., 15.56 pounds were used, showing a saving of 8.4 per cent. for the superheated steam. With 13 degrees superheat and 196 B. H. P., the consumption was 15.53 pounds, while saturated steam required

at a load of 195 B. H. P. 16.54 pounds. The saving here is 6.5 per cent. The regulation of the turbines was remarkably good, as the variation in speed due to varying the load in no case exceeded 1 per cent. With eight nozzles and 352 B. H. P. the speed was 750 revolutions per minute; with seven nozzles and 298 B. H. P., 756 revolutions per minute; five nozzles and 196 B. H. P., 745 revolutions per minute, and with three nozzles and 119 B. H. P., 751 revolutions per minute.

A commission appointed by the French Ministry of Public Works has recently made experiments to determine the strength of concrete steel. Bars 2 m. long and 10 cm. square were used, with a steel rod in each corner. The sectional area of the steel was 1.12 square cm., or a total of 1.12 per cent. of the whole area. In setting it was found that the contraction of the concrete gave rise to initial stresses amounting to a compression of 2.85 tons per square inch in the steel and a tension of 74 pounds per square inch in the concrete. Tested in tension it was found that the specimen stretched rapidly to the elastic limit of the concrete, after which the steel took all the additional load until rupture occurred. Thus during this period the elastic modulus of the concrete was *nil*. The conclusion reached was that under tension concrete steel acts precisely like ordinary concrete up to the usual breaking stress of the latter. With higher stresses it can be loaded until the extension equals 1-500 of the original length when hardened under water. When subjected to repeated tensile stresses the percentage of the load carried by the steel increases until the concrete has only 70 per cent. of its initial load.

The new power plant of the Assabet Mills, at Maynard, Mass., owned by the American Woolen Company, has a battery of 21 vertical boilers of a modified Manning type, internally fired. The shell has an external diameter of 8 feet, each boiler having 348  $2\frac{1}{4}$  inch tubes. 15 feet long. An annular space between the tubes and the shell allows for inspection and cleaning. The heating surface of each boiler is 2965 square feet, and the grate area 38.5, giving the high ratio of 77 to 1. Bituminous coal is used and a pressure of 140 pounds maintained. The new engine room is a brick structure measuring 81 feet by 45 feet. It contains two McIntosh & Seymour vertical cross compound engines and one horizontal Ames engine, all driving General Electric three-phase generators, the two McIntosh & Seymour engines being direct connected. They are a 2230 horse-power engine, 32 and 64 inches by 48-inch stroke, running at 120 revolutions per minute, and a 760 horse-power engine, 20 and 40 inches by 36 inches, running at 133 revolutions per minute and driving 40-cycle generators of 2000 and 500 kw. capacity respectively. The Ames engine drives a 100-kw. 40-cycle generator, and also, when necessary, a belted exciter. Excitation is usually accomplished by means of a motor generator, deriving its power from one of the big machines. Two 1000-gallon Underwriter fire pumps constitute an important part of the system.

The Feather River Power Company, recently incorporated in San Francisco with a capital stock of \$5,000,000, are about to install an electric power plant 20 miles above Oroville, where a tunnel over 12,000 feet in length has been driven and a dam constructed. The present company have acquired all the property of the Big Bend Tunnel & Mining Company, the latter being responsible for the tunnel and dam, and will build their power house at the outlet of the tunnel, where a head of about 450 feet is available. At least 20,000 horse-power will be transmitted to San Francisco at a high voltage. It is estimated that the entire cost of the system will approximate \$2,000,000.

The four main cables of the new East River Bridge are the largest in the world, being 18 inches in diameter, 3000 feet long and weighing 2,500,000 pounds each. Composed of some 10,400 straight steel wires, each

cable has an ultimate strength of about 50,000,000 pounds. The wires, 3-16 inch in diameter, were received in 4000-foot lengths and their ends spliced with sleeve nuts to make them continuous throughout each of the 37 strands. They are to be covered with a water tight cylinder of sheet steel.

The consumption of liquid fuel without the use of the steam jet is accomplished by the superintending engineer of a Dutch steamship line in the East Indies. The oil is forced into the furnace by means of a donkey pump, the oil coming from a storage tank through a small heater, where it is warmed by the exhaust from the pump, the exhaust then going to the ship's condensers, as the apparatus was designed especially to save the water which would be required by the jet. The oil is discharged by the pump through another heater, where it reaches a temperature of 200 degrees F. The front end of the furnace is closed with a cap of steel, and an annular space around this is formed into the furnace, with spiral air guides to cause the in-flowing air to take up considerable heat before entering the interior. Part of the air is allowed to ignite with the oil as it sprays from the injector, but the bulk of the combustion is completed further on. No air blast is used.

The East Boston Tunnel, under Boston Harbor, and the Washington Street Subway have been leased for a term of 25 years to the Boston Elevated Railway Company by the city. The rental is fixed by the contract at  $4\frac{1}{2}$  per cent. of the cost of construction.

An illuminated tracing table has recently been installed in a Boston drafting room for making tracings on thick paper or from drawings having weak lines. A large drawer fits under the top of the table, a rectangular hole being cut in the latter and a large piece of French plate glass set in. In this drawer is a cluster of incandescent lights with a white porcelain reflector. This cluster may be moved to any portion of the drawer, so as to come under that part of the drawing which has most need of it, the illumination not being uniform all over the drawing. A great variety of uses have been found for this equipment, such as comparison of alternative designs, and the tracing of additions directly on brown paper drawings or blue prints.

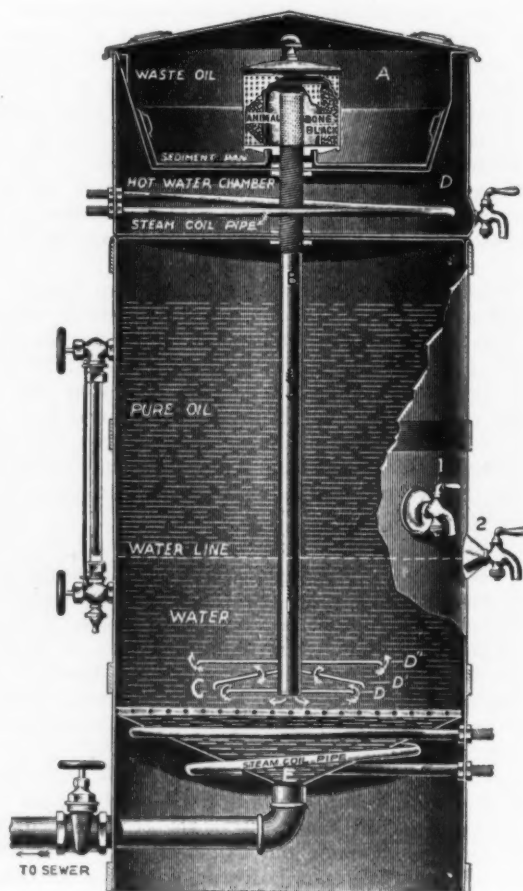
### The American Oil Filter.

In the average power plant from 50 to 75 per cent. of the lubricating oil can be collected and filtered over and over again until entirely used up. This saving amounts to from 50 to 90 per cent., depending upon how carefully the oil is collected. Large plants always economize in every way possible, and small plants could make considerable saving by installing an oil filter suitable to their needs.

The American oil filter, made by the Burt Mfg. Company of Akron, Ohio, is sharply differentiated from its competitors through the device of a hot water chamber on top, as shown by the sectional engraving. The heat at the top thins the oil and causes it to flow readily, and the difficult work of filtering the heavier grades of oil is performed with ease. The filter is made of extra heavy galvanized iron, all the joints being soldered, lapped and riveted. To work the filter it is filled with warm water up to the faucet 2. Then the upper chamber is filled with waste oil and the steam connections made. The chamber A is filled with waste oil. The operation is then as follows: Through the filtering material in the cylinder the oil makes its way into the tube B and down onto the filter plate D, where the pressure of the oil above overcomes the resistance offered by the weight of the water, and the oil spreads out in a very thin film, becoming thinner and thinner as it travels from the center to the circumference of the plate. Every particle of oil is thus exposed to the action of the water. This process is repeated as the oil flows upon

the plate D 1 and D 2. The separation of the oil from every foreign ingredient is complete. The remaining impurities settle by force of gravity to the bottom of the chamber E and are drained off by simply opening the valve. The pure oil is drawn from the faucet 1.

To clean the filter the top cylinder is unscrewed, the filtering substance removed and the sediment pan, in which a large quantity of dirt and grit collects through the force of gravity, is lifted out. The changing of the filtering material does not interrupt the oil service and the pure oil can be drawn as needed. To change the water at the bottom the valve in the sewer pipe is opened, when the water and dirt will flow off. In this filter any kind of filtering substance can be used—sponges, raw wool, common white waste, white pine sawdust, animal bone black, &c. All the filters are packed with animal bone black because the makers have found it best for cleaning lubricating oil. The fact that it is used in the manufacture of lubricating oils is



THE AMERICAN OIL FILTER.

sufficient proof of its excellence as a filtering material. Moreover, it can be washed out with hot water or gasoline and used again and again. Thus there is practically no expense in operating.

At the Ohio Works of the National Steel Company, at Youngstown, Ohio, which has been on rails for some months, some excellent records for production are being made. The original output of this works was estimated at about 35,000 tons of rails per month, but in September over 42,000 tons of finished rails were rolled and last month the output was expected to exceed 50,000 tons. In fact, the output of the Ohio Works is now very close to that of the Edgar Thomson plant of the Carnegie Steel Company, which turns out a little over 60,000 tons of rails per month on an average.

Wyman & Gordon of Worcester, Mass., have issued in neat form a "Short Story of Alfred Krupp," accompanied by an excellent likeness of the famous iron-master.



## Corrosion of Steel Frames of Building.\*

BY CHARLES L. NORTON.

There can be no question that moisture and carbon dioxide are the active agents in causing much of the rusting of steel. To what an extent the two are relatively responsible and in what measure they need renewal, to keep up the process, is uncertain. It has been held that the formation of a coat of rust upon the surface of steel was the beginning of a progressive action whereby the rust, or iron oxide, acted as a continuous carrier of oxygen to the steel beneath. This process seems to require only moisture and atmospheric air containing carbon dioxide to start it, but as to the depth of penetration of the process I know of no assignable maximum in any given time. It is extremely probable that in a comparatively dry place the process is exceedingly slow.

There can, of course, be no question as to the ease of access to the steel, in many cases, of both moisture and carbon dioxide. When steel is bedded in the wall of the building, as is almost always the case, the changes in temperature from time to time, as well as the more or less constant difference in temperature between the two faces of the wall, tend to cause a condensation of moisture in the wall at different points. Further, the necessary carbon dioxide is most plentiful in the large cities, where the steel frame is most common.

When the walls of the building are of brick or stone moisture and carbon dioxide may usually enter at the joints and, to a greater or less extent, through the body of the stone or brick. Few stones are, however, porous to such an extent as to allow an appreciable penetration. Terra cotta tile is of itself porous, and the existence of air passages tends to increase the condensation of moisture and absorption by the terra cotta and possible contact with the steel. Concrete, made of Portland cement with sand and either cinders or stone, would seem to offer more protection to the steel than any of the materials just mentioned; yet we hear from time to time of the loss by corrosion of steel bedded in concrete.

A study of the action of Portland cement concrete on steel was begun under my direction by P. C. Pearson in December, 1901, and it is my purpose to report upon this and some later observations as a preliminary to more work of the same nature now under way.

It has been held by several engineers that the mere alkaline nature of Portland cement was a sufficient guarantee of its protecting steel from rusting. There is, of course, good chemical reasoning for this, the familiar use of strong alkaline solution in boilers to prevent the formation of scale being based upon the same principle. This would seem to settle the matter once and for all, were it not a fact that steel bedded in concrete has corroded very rapidly, while other steel in a different concrete of the same kind of cement stands without change for ten years or more. The investigation was started not to find out that steel could not be protected by concrete or that it could be, for on that point we were sure, to start with, but we have tried to find a reason for occasional failure and to suggest a remedy.

An examination of several cases where expanded metal had been imbedded in concrete showed plainly that rusting began wherever the steel was exposed through cracking, even though the cracks were very fine. It would seem that the alkaline nature of the cement would be sufficient to prevent corrosive action occurring within a few hundredths of an inch on the moist surface of the steel, but such is not always the case.

To study the matter systematically, two brands of American Portland cement, Alpha and Lehigh, were selected; two kinds of cinders, one from the sugar re-

finery, the other from the Boston & Albany locomotives; a sharp, clean beach sand, and a hard, clean broken stone, the larger part being fragments of flint and trap rock. Concretes were made up in bricks about 3 x 3 x 8 inches, with the steel specimens near the center.

The following mixtures were tried at first; others will be reported on later: Neat cement; cement, one part, to three of sand; one part of cement and five parts of broken stone, and one part of cement to seven parts of cinders. All briquettes were made in duplicate with both cements. There were later made up briquettes of one part of cement to two parts of sand and five parts of cinders, and of one part cement to two of sand and five of crushed stone.

It was hoped to vary the density, the porosity and the nature of the contact with the steel, as well as the chemical composition of the concretes. The cements were tested chemically and physically and found good. The cinders, when washed down with a hose stream and dried, tested distinctly alkaline, and analysis revealed very small amounts of sulphur. The stone and sand were thoroughly washed and clean. The ingredients were mixed dry in every case and, when wet, thoroughly mixed and tamped until wet on top.

The cleaning of the steel was the most troublesome problem met with. It was necessary to scour the pieces, then pickle in hot dilute sulphuric acid, and finally dip into hot milk of lime. When cold the lime was removed with a wire brush. This left the steel clean and bright, ready to be put into the test bricks.

The specimens used were a mild steel rod 6 inches long and  $\frac{1}{4}$  inch in diameter, a piece of soft sheet steel 6 x 1 x 1-32 inch, and a strip of expanded metal 6 x 1 inch, all three pieces being put in each brick. Since time would not permit of our exposing these specimens to natural conditions, we inclosed them in several large tin boxes, sealed tightly, and subjected one-quarter of them to an atmosphere of steam, air and carbon dioxide, and second quarter to air and steam, a third to air and carbon dioxide, and a fourth stood upon the table of the room, with no special care as to their temperature or dryness. Of the entire number about one-half were set in water for one day, the rest for seven days, before sealing up. At the end of three weeks the briquettes were carefully cut open and the steel examined and compared with specimens which had lain unprotected in each of the tin boxes. Those specimens which were mixed of neat cement can be dismissed without discussion, for the protection was perfect. The steel was as bright as when put in.

The unprotected pieces were found to consist of rather more rust than steel. The steel was wrapped about pieces of urallite, to serve as a means of identifying it by number, the stamped numbers being nearly obliterated by the rust. Of the remaining specimens hardly one had escaped serious corrosion. The location of the rust spot was invariably coincident with either a void in the concrete or a badly rusted cinder. In the porous mixtures the steel was spotted with alternate bright and badly rusted areas, each clearly defined. In both the solid and the porous cinder concretes many rust spots were found, except where the concrete had been mixed very wet, in which case the watery cement had coated nearly the whole of the steel, like a paint, and protected it. Some briquettes made later of finely ground cinders and cement, in varying proportions, when exposed to moisture and carbonic acid, showed how effectually the presence of cement prevented rusting, even in a highly porous mass—one cement to ten of cinder—provided there were no cracks or crevices or distinct voids.

From the examination of these several hundred briquettes we were able to draw several conclusions:

1. Neat Portland cement, even in thin layers, is an effective preventive of rusting.
2. Concretes, to be effective in preventing rust, must be dense and without voids or cracks. They should be mixed quite wet where applied to the metal.
3. The corrosion found in cinder concrete is mainly

\* Report of the Insurance Engineering Experiment Station of the Associated Factory Mutual Fire Insurance Companies, Boston.

due to the iron oxide, or rust, in the cinders and not to the sulphur.

4. Cinder concrete, if free from voids and well rammed when wet, is about as effective as stone concrete in protecting steel.

5. It is of the utmost importance that the steel be clean when bedded in concrete. Scraping, pickling, a sand blast and lime should be used, if necessary, to have the metal clean when built into a wall.

In the matter of paints for steel there is a wide difference of opinion. I cannot believe that any of the paints of which I have any knowledge can compare with a wash or painting with cement. Moreover, if paint does disintegrate, it leaves a thin void next the steel, the worst possible condition. I examined some steel Z bars not long ago which were exposed in process of altering a building five years old. It was clear that the steel was rusty when painted and that moisture had penetrated through the paint, caused the rust to increase and split off the paint. This was a case where the steel was built into the brick work with no attempt at any protection other than the paint.

It is, in my opinion, perfectly clear that the coating of all steel work with cement before applying the concrete or tile or brick, as the case may be, is an absolute essential, if the formation of rust and consequent weakening of the steel is to be prevented. The thickness of the cement layer need not be great, but it should be a continuous coating, without cracks. The steel should be perfectly clean; but if, as is often the case, the choice is between paint and rust which accumulates during construction, the paint is to be preferred. Mr. Pearson suggested the use of Portland cement in protecting the under side of railroad bridges against rust and the blasting action of the gases and cinders from locomotives. I think this merits a careful trial.

#### Shenango Valley Notes.

NEW CASTLE, PA., November 1, 1902.—The railroads promise a large part of the development to be made by the Shenango Valley during the coming year. The Pittsburgh & Lake Erie and the Pennsylvania Company will make highly important improvements and betterments on their lines. The Baltimore & Ohio Company will expend \$500,000 at New Castle Junction in repair shops and round houses. The Bessemer & Lake Erie will build a line into a new coal field near Muddy Creek, Butler County. The line will be 30 miles long and will cost \$1,500,000, the contract having already been awarded.

Coal lands and limestone properties are being looked after carefully by prominent capitalists in this section. Some fine coal and limestone property in Lawrence County is not yet taken up, nor much developed, which doubtless will ere long change hands. A New Castle syndicate has options and leases on several hundred acres in a very favorable location as to railroad facilities, and it is likely that a new mineral field will be developed by them or by others under their leases in the near future.

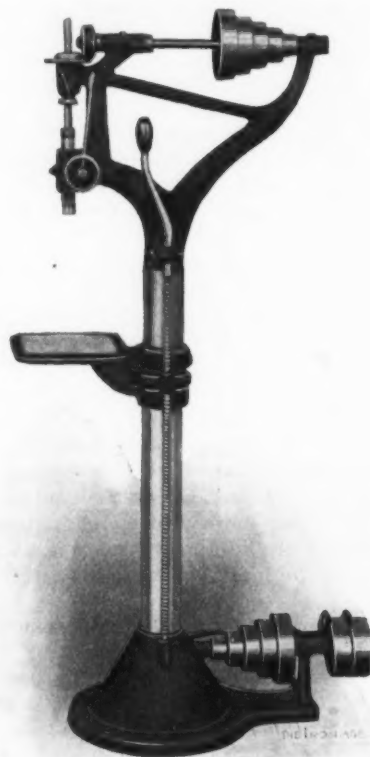
The reports of West Pittsburgh, the new town laid out this fall by John Garland of the Garland Rivet Company, are incorrect in some particulars. The town is south of New Castle, instead of east, as has been frequently stated, and while it is perhaps 5 miles south of the center of the city, it is scarcely a mile and a half south of the city limits of New Castle. In fact it looks as if the land between New Castle and West Pittsburgh will soon all be occupied by mills or residences. The town of West Pittsburgh has been conceived and laid out in the most up to date style, the principal north and south streets being 70 feet wide. These streets were paved and sewered before any lots were offered for sale. The principal plant at present being built is the Garland Rivet & Chain Works, which is just west of the Pittsburgh & Lake Erie and Baltimore & Ohio tracks. Over \$100,000 was invested on the plot before there was a lot sale.

At present there is considerable of a stir in the towns of the Shenango Valley over the prospect of the Wabash Railway system reaching New Castle and Sharon. It seems to be reasonably certain that the road will be built

into New Castle, and there are rumors that a survey will soon be made from New Castle up the valley to Sharon, or at least as far as to South Sharon. The building of this new line is only one of the many signs of a wider business development awaiting the towns of the Shenango Valley. The right of way has not yet been secured for the entrance of the Wabash into New Castle, but the route proposed has been staked out on the ground through Beaver and Lawrence Counties.

#### The New Barnes Sensitive Drill.

While the new sensitive drill manufactured by the B. F. Barnes Company of Rockford, Ill., is similar in its general design to their regular line of upright drills, its distinguishing feature is in the construction of the friction drive. The upper cone shaft is equipped with a leather friction disk which runs on a friction plate on the spindle. This friction plate has underneath it an adjusting screw for tension, which enables the operator



THE NEW BARNES SENSITIVE DRILL.

to make the drill sensitive to any degree for light or heavy work. The five-step cones provide all the necessary speeds, so that the friction disk is used only for driving and not for change of speeds, as is the case with some drills of this type. The machine will drill up to 5-16 inch.

**Modern Gunmaking in New England.**—The United States Government has contracted with the Fore River Ship & Engine Company of Quincy, Mass., for ten sets of the largest guns of modern type ever made in New England. They are 6-inch, 50-caliber guns of the latest rapid fire model for use on war ships. Within a week after this contract was signed another was placed with the same company for 60 sets of 3-inch, 50-caliber guns, which are also for naval use. The guns will be forged, oil tempered and annealed, bored and turned at Fore River and then sent to the shops at the Washington Navy Yard to be finished. The company have all the material for the steel bridge, which is to replace the old modern turnpike bridge connecting Quincy Point and Hingham, Mass., ready and construction work will be begun in a few days. Work on the twin battle ships "New Jersey" and "Rhode Island" is getting along nicely, and rapid progress has been made on the cruiser



"Des Moines," since she was launched in September. The first of the two steel car floats for the New York, New Haven & Hartford Railroad will be put overboard about November 1, and the other a week later.

## Notes from Mexico.

### "Mergers" in Mexico.

DURANGO, October 27, 1902.—The movement in the direction of the consolidation of business interests, although in its infancy in Mexico, manifests signs of growth from time to time. An effort has recently been made to consolidate several of the large cigarette manufacturing, and not long since the companies owning the cotton factories—the most important of the native manufacturing industries—evinced an inclination to "merge." A combination of railway interests has been talked of for some time past. The purchase by the Government of a controlling interest in the Interoceanic Railway was a direct check to this latter movement. At present there is no well organized "trust" in this Republic. The nearest approach to one is the smelting interest, which, however, is of alien birth. It is doubtful whether, if a trust by any means should be evolved, it would exist a day longer than it became burdensome to the public, by reason of exactions or other cause. President Diaz has upon more than one occasion effectually blocked movements designed to "corner" food products; an obnoxious "combine" would not be likely to pay large dividends long, or small ones indeed, if there were evidence that injustice was a factor in their earning. Trusts of the beneficial class may possibly make their appearance, and do good, and be a gain all around. The leading daily of the City of Mexico believes they are sure to come. It says under this head: "Fifty years hence a great many properties in Mexico will be merged in corporate ownerships. Mills will be combined in trusts, or something similar; there will be mergers of well approved mines just as the smelters are now part of a North American combination." Furthermore, this editor sees "trusts" in real estate, and combination in finance; "bank mergers are sure to come," he predicts. At this time, however, the individual is supreme in trade and waste goes on.

### Harvest Prospects.

The rainy season, which is nearing its end, has been more than usually favorable for the planting and maturing of crops. Reports from most of the States indicate an abundant harvest, and, consequently, lower prices for the cereals, upon which the great body of the people depend for sustenance. The outlook has not been so favorable for many years. This condition will have a directly beneficial effect upon all lines of business and stimulate the demand for foreign products.

### Order for Arms.

Congress has authorized the President to pay to the Deutsche Waffen und Munitions Fabriken of Berlin the equivalent of 1,183,000 marks as payment on account of an order for 42,000 Mauser rifles, 9000 carbines and 6,000,000 smokeless cartridges.

### Trade Statistics for July.

During the month of July foreign products of the value of \$5,943,850.58 (gold) were imported into Mexico, an increase of \$1,701,218.43 over the total for the corresponding month last year. "Machinery and apparatus" contributed \$779,081.94 to the total; "vehicles," \$91,207.15, and "arms and explosives," \$114,798.63. The aggregate value of the exports for the same month was \$11,711,573.05 (silver), an increase of \$417,425.15 over the total for the month of July, 1901.

### Industrial Notes.

A German hardware manufacturing concern has decided to establish branch factories in Mexico, and has selected Monterey and some point in the Federal district as the localities where their plants are to be built. They will make cutlery and domestic specialties in pottery.

The California capitalists who have spent some \$5,000,000 in buying lands, prospecting and drilling oil wells at El Ebano, near Tampico, are about to lay out a large sum of money in improvements and enlargement.

The company's plans include the building of warehouses and tankage capacity for 4,000,000 gallons of oil, an asphaltum factory, electric light plant, machine and blacksmiths' shops and a cold storage plant. According to a statement made by the president of the company they have at the present time eight producing wells, whose combined product is 600 barrels of oil daily.

The general ordinary meeting of the National Iron & Steel Works, South America, of the City of Mexico, D. F., has been called for the 31st of the present month. In addition to the routine business the "order of the day" includes the subjects of "Receiving and Considering Propositions for the Improvement of the Plant" and "Distribution of Profits."

G. F. Meehan, president and general manager of the Monterey Foundry & Machine Company of Monterey, N. L., has resigned, and is succeeded by F. J. Llewellyn of St. Louis, Mo. Mr. Meehan is interested in iron and steel making in the Southern States, and he will assume the management of those interests. J. J. D.

## The Strength of Ferroconcrete.

In a recent communication to the Paris Académie des Sciences M. Considère describes a series of valuable experiments carried out by a commission appointed by the Ministre des Travaux Publics, with a view to ascertaining the precise role played by the metal in ferroconcrete constructions. The specimens tested by the commission were generally 6.56 feet long, and had a cross section 3.94 square inches. Each of these concrete bars was reinforced at the corners by four steel rods, having a total section of 0.177 square inch. The concrete employed was made by mixing 661 pounds of Portland cement with 1.04 cubic yards of gravel, passing a 0.98-inch screen, and 0.52 cubic yard of sand, passing a 0.19-inch screen. It was found that in setting the contraction of the concrete gave rise to an initial compression in the steel reinforcement amounting to 2.86 tons per square inch of the metal. The corresponding tensile forces simultaneously called forth on the concrete amounted to 74 pounds per square inch. Tested in tension, it was found that the specimens stretched rapidly until the stress on the concrete was practically equal to the ordinary tensile strength of this material. From this point the tested bar stretched much less rapidly, and throughout this period the tensile stresses in the concrete remained constant, the whole increase of load being taken by the steel bars. It follows, therefore, that during this period the elastic modulus of the concrete was zero. In one case the test bar was subjected to a load of 2060 kilogrammes, equivalent to a stress of 292 pounds per square inch of cross section, under which the total extension of the specimen was 0.024 inch. The reinforcing rods were then cut out, and the + shaped bar left was then tested in cross breaking, and in spite of being somewhat injured in the cutting out of the reinforcing bars, only failed under a calculated stress of 128 pounds per square inch.

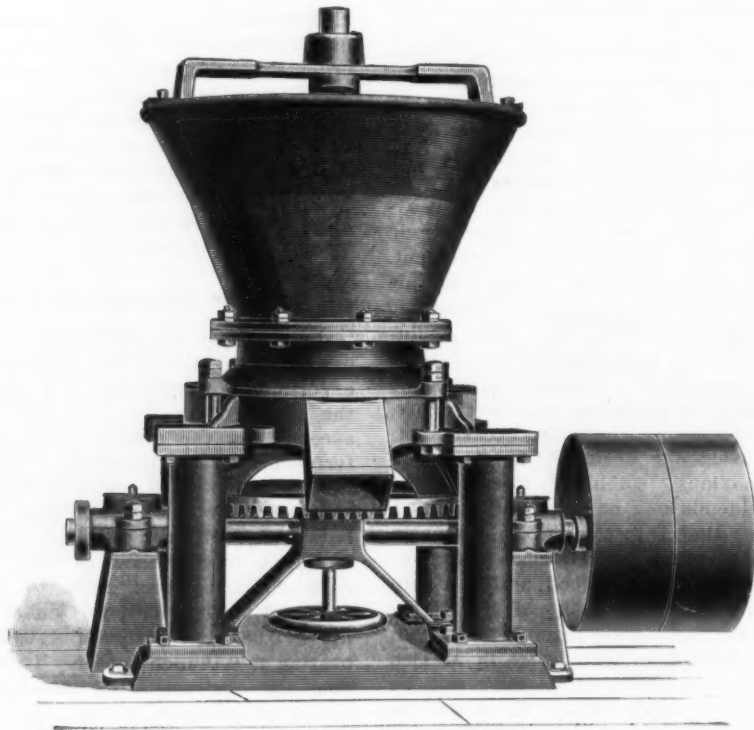
Summing up, M. Considère states that ferroconcrete submitted to tension acts precisely as ordinary concrete, so long as the tensile stress does not exceed the usual breaking stress of ordinary concrete. Under higher stresses it will support without breaking extensions which in the case of specimens hardened under water have been as great as one five hundredth the total length; and in the case of air hardened concrete have ranged between one two thousandth and one eight hundred and fiftieth of the total length. When the ferroconcrete is stretched beyond the usual elastic range of ordinary concrete the tensile stress on the concrete remains constant up to the ultimate breaking point, the whole of the additional load being taken up by the metal. When subjected to repeated tensile stresses, however, the fraction of the load carried by the metal tends to augment, and that of the concrete to fall, until ultimately the working stress on the concrete is only 70 per cent. of its original value. If finally, after a series of loadings and unloadings, the maximum load is raised 30 per cent., the concrete again exerts a tensile resistance equal to its primitive value. It may be added that the modulus of elasticity in compression of a ferroconcrete bar is reduced on stretching the latter.

### Burning Coal Dust Without Smoke.

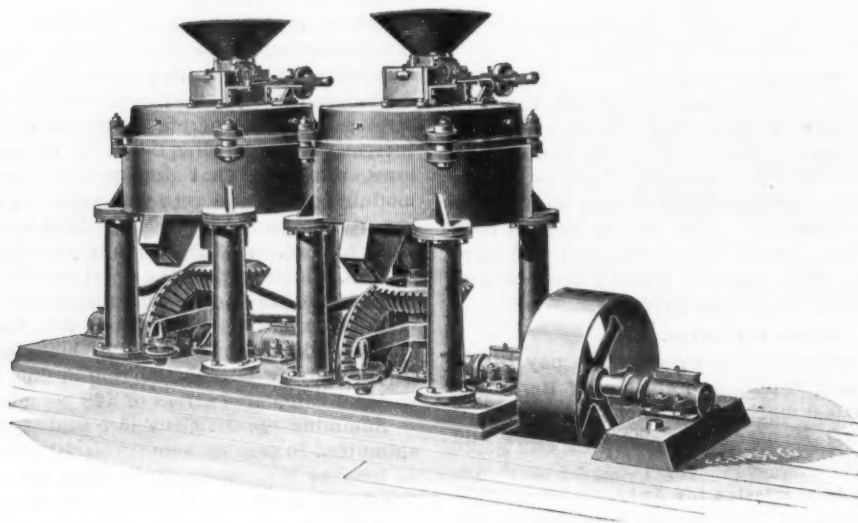
The crusade against smoke, which is beginning to make itself felt in many American manufacturing cities, is becoming very strong in Cleveland, where the immense consumption and almost exclusive use of bituminous coal have long threatened to make that otherwise beautiful city extremely undesirable for residence purposes. Through the efforts of some of the better class of manu-

of that city, who for several months have had in operation under their boilers a device which has attracted much favorable comment among manufacturers interested in the movement. In their practice they now thoroughly dry the coal before using it, and after several months of satisfactory and economical operation they maintain that three paramount rules must be practiced to insure perfect combustion.

1. The coal must be of uniform size. In other words,



*Crushing Outfit.*



*Fig. 2.—Pulverizing Outfit.*

### BURNING COAL DUST WITHOUT SMOKE.

facturers, abetted by a live and enthusiastic smoke inspector, conditions in Cleveland have improved considerably of late. Many forms of smoke preventives and consumers have been adopted, and the majority of the modern plants have been equipped with modern stoking outfits which are more or less successful. In consequence of this crusade the efforts of a number of Cleveland concerns have been turned toward developing new devices which shall more thoroughly consume the fuel than has been possible with the old system of hand firing.

One of the most successful of these experiments has been conducted by the C. O. Bartlett & Snow Company

they claim it is impossible to secure the same results from burning a lump of coal as large as a man's head and another the size of a pea; coal must be of even size before perfect combustion can be had.

2. Coal must be of equal moisture; the same results cannot be obtained from burning coals of different moisture. Run of mine coal containing 5 to 6 per cent. moisture will not give the same combustion as fine slack containing 10 to 12 per cent. moisture. They also maintain that the plan of wetting coal before putting it into the furnace, or admitting steam jets under a boiler, is a fallacy possessed of no merit.

3. Powdered coal must be burnt in suspension.



If it is swept or pushed into a furnace the heavy particles fall to the bottom and become solid clinker, which is objectionable and almost impossible to get out, but by burning the dust in suspension it is claimed absolute combustion is obtained.

With these important objects in view they first crush the coal into a uniform size in one of their standard crushers. It is then taken to one of their drying outfits, where it is dried down to 2 per cent. moisture. It

age bin to a spout, B. The speed of this conveyor controls the amount of coal used, and it can be regulated by adjusting a roller to or from the center of a friction disk on the conveyor. From the conveyor the coal is fed direct to the air spout A. On the inside of this spout there is a nozzle which concentrates the air just as it strikes the coal coming down from the conveyor, thoroughly mixing the coal with the air and at the same time preventing any danger of clogging. The coal is

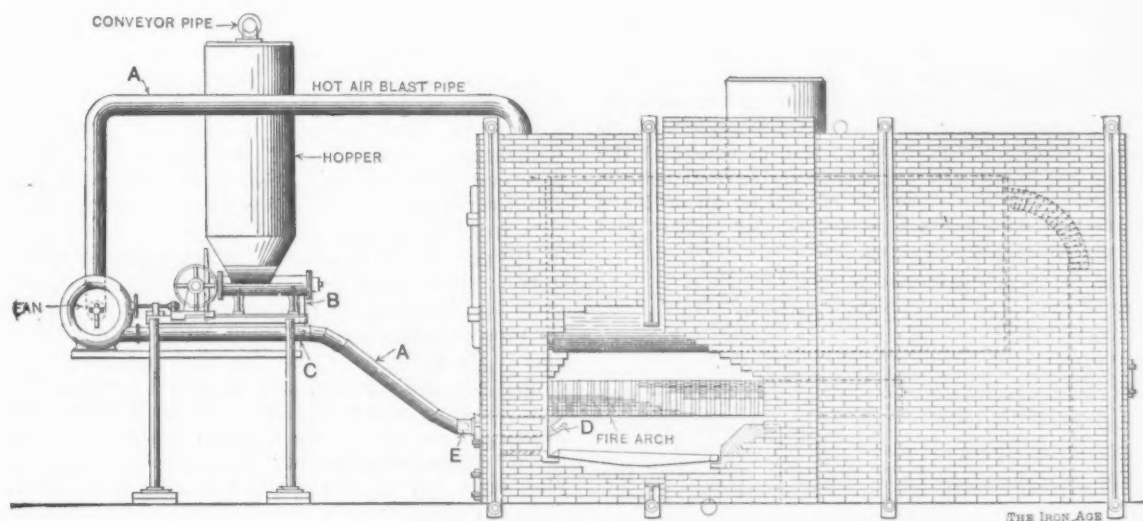


Fig. 3.—Section through Boiler.

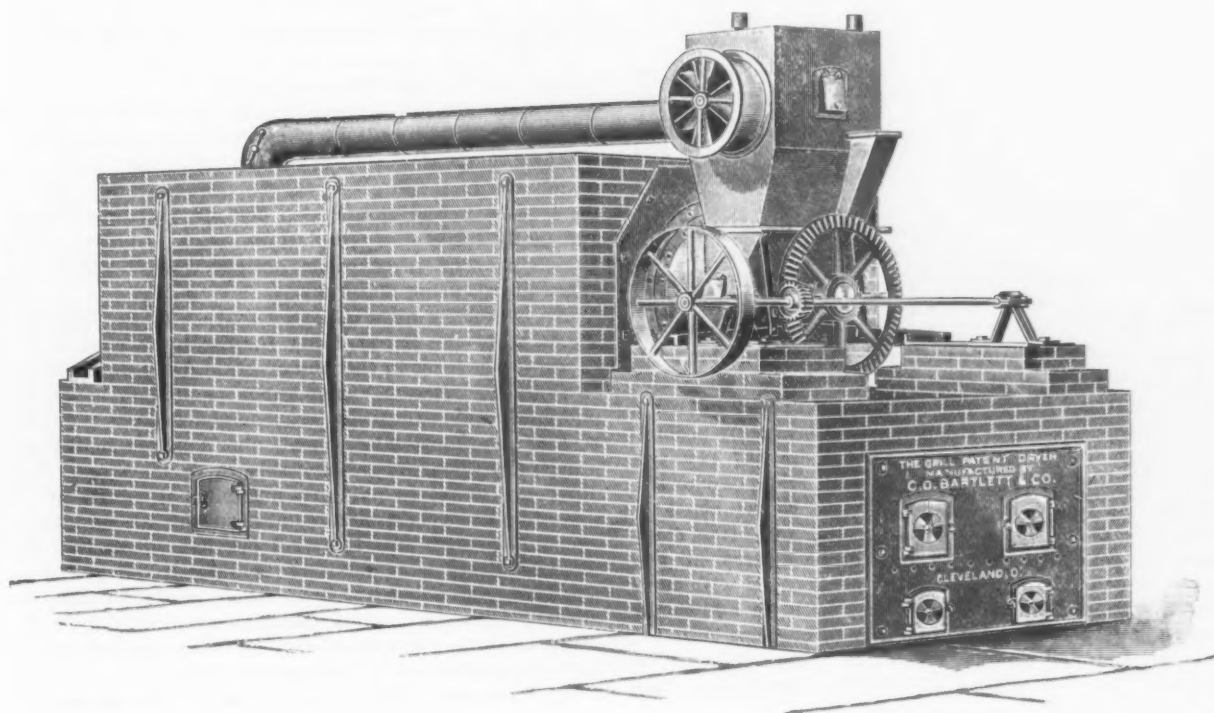


Fig. 4.—General View of Boiler, Showing Drying Outfit.

#### BURNING COAL DUST WITHOUT SMOKE.

is then pulverized in a machine of their make, which grinds it down to 80 mesh fine, making it practically coal dust. It is then fed to the furnace by what they designate as the Rowe feeder system, which is the unique feature of their method of fueling. This is detailed in the drawing presented herewith, Fig. 3.

The ground coal is stored in an iron storage tank or hopper, above or near the boiler. An air pipe, A, is connected with the feeder spout at the furnace, and above the boiler, in the breeching or stack, a blower fan of sufficient size to furnish the necessary air for burning the coal is attached to this pipe. The coal is conveyed by a worm or spiral conveyor from the bottom of the stor-

age bin to a spout, B. The speed of this conveyor controls the amount of coal used, and it can be regulated by adjusting a roller to or from the center of a friction disk on the conveyor. From the conveyor the coal is fed direct to the air spout A. On the inside of this spout there is a nozzle which concentrates the air just as it strikes the coal coming down from the conveyor, thoroughly mixing the coal with the air and at the same time preventing any danger of clogging. The coal is

For commercial use the company propose to furnish

the outfit equipped with a system of conveyors so that it is not necessary to handle the coal from the time it is dumped onto the coal pile—overhead preferred—until it reaches the fire. It is claimed the entire outfit can be installed at a cost not to exceed that of a modern mechanical stoker outfit, and that the difference between the cost of slack and run of mine coal will fully pay for drying and grinding.

Recently comparative tests were made with and without the outfit under the company's 100 horse-power boilers. With the use of the outfit, 2200 pounds of slack were used in a 10-hour run. The following day 2850 pounds of run of mine was consumed in ordinary shoveling. In burning, the coal dust is consumed with a roar very similar to that experienced in the use of crude oil. The heat is uniform at all parts of the grate and no stoking is necessary. There is no sign of smoke at the stack and the company's ash pile after several months of use is smaller than would be caused by an ordinary week of hand firing. There is no sign of cinders and the residue is largely red silica.

### Procuring Materials.

BY W. G. MUNN, LOUISVILLE, KY.

For the past three years "procuring materials" has been the most difficult problem for us to solve. Prior to that time the energies of the salesmen of our establishments were taxed to their utmost to dispose of the output. Since then the mantle of worry has settled upon the shoulders of the men who procure the materials and the path of the buyer of supplies has not been strewn with roses. On the contrary, it is marked by the wrecks of many shattered hopes for a decline in the market, and the bones of broken promises to deliver whiten by the wayside.

Expired contracts with the maximum quantity just one-third of what it ought to have been and the time limit all too short stand like gaunt sentinels to mark the place where old prices left the time worn pike and struck off up the mountain side to heights unheard of since the war.

Standing on these heights one grows dizzy with the prospect, and the head swims at the thought of the many steep ascents on all sides. When will the descent begin and what will be the pace? The fear of having a large contract mark the summit of the advance has caused not a few restless nights to the anxious buyer.

In 1898 bar iron or steel could be bought at \$22.30 per ton flat, no extras, cut to any length and quantity of one size, f.o.b. buyer's depot, with reasonably prompt deliveries. To-day the same steel costs \$37 per ton for base sizes, on time contracts, with from two to six months' deliveries, an advance of over 65 per cent. on base sizes, or for reasonable deliveries, and often from the same sellers, at \$45 per ton for base sizes, an advance of over 100 per cent., and in all cases with one-half the standard card extras, and with an additional charge of \$2 per ton where quantity of one size is under 2000 pounds and \$6 per ton extra when under 1000 pounds. Bar iron is from \$3 to \$6 per ton higher than steel.

Foundry coke four years ago was worth \$4.25 per ton, f.o.b. Louisville. To-day the same coke is quoted at \$12.75, an advance of over 300 per cent., and none on the market.

In 1898 No. 1 foundry pig iron was worth \$12.50 per ton, f.o.b. Louisville, Ky. To-day the same iron costs \$26.50 per ton, or over 110 per cent. advance, and it is almost impossible to obtain at that price.

In 1898, before the consolidation of the various iron and steel rolling mills, buyers transacted their business with the mills direct, and the superintendents were in many instances known to them personally. Information as to rolling programmes, shipments, deliveries, tracers, errors, &c., could be obtained from the fountain source. It could, as a rule, be relied upon and work mapped out accordingly. Now the country is divided

into districts, over which are placed, in some convenient city, very agreeable and pleasant gentlemen called "district managers." They occupy magnificent offices, are surrounded by a host of clerks, and all orders and communications must come through them. On receipt of an order from a customer the manager acknowledges it, for attention as soon as possible, and sends it to a mill from 500 to 1000 miles away. On receipt of the acknowledgment of the order the customer writes back: "Please name a date on which we can rely upon getting this material." The manager answers: "On account of the crowded condition of the mills it is impossible to state exact date of shipment, but we expect to ship it in about 90 days." When the time has expired the buyer writes the manager: "When will you ship my order? Must have it. Cannot wait longer." The manager, in order to get the inquiry off his desk, answers: "Delayed by a breakdown. Expect to ship in about three weeks." In a few days thereafter customer gets from head office of the company invoice and bill of lading for the shipment. When material arrives it is sometimes found to be of an inferior quality or not according to order. The matter is taken up vigorously by wire or long distance 'phone with the district manager. He answers: "Must be some mistake. If you cannot use the material ship it back to such and such a mill and we will replace it." Customer asks "When? Season is now on us. We must get this stuff or lose our trade." Manager answers: "Cannot promise exact shipping date, but believe we can replace it in about 90 days." Customer keeps the material and his temper, if possible, and does the best he can or has to buy from prompt delivery stock and pay prompt delivery prices. This is about the state of affairs at present. I do not think it is exaggerated. Every buyer can no doubt recognize familiar passages in the foregoing description. Material must now be ordered months and occasionally a year in advance in order to insure delivery at a time that can be relied upon. In the meantime it is likely to be shipped out of season, prices may decline, demand may slacken or pattern of implements into which the material goes may be changed and make it dead stock before it arrives. The above are a few of the many trials and tribulations every implement and vehicle manufacturer has experienced in the last four years in procuring materials.

An especially unsatisfactory feature of the situation seems to be the impossibility for the implement manufacturers, at least in the line of grain drills and seeders, to raise the prices of their goods enough to cover the enormous advances they are compelled to pay in the cost of raw materials. The jobber's prices to-day are practically the same as they were three years ago. The difference in prices paid for materials is added to the manufacturer's cost and comes out of his profits. I can only account for this fact on the ground that the manufacturers who persist in selling at old prices do not know the present cost of their goods, or else, regardless of consequences, hope to eventually gain the trade of some competitor who, knowing the cost of his product, may decide to advance his prices.

The situation seems to me to be a serious one and ought to engage the earnest consideration of every implement manufacturer. I have heard it urged, with much force, that the only natural and logical solution to the problem is consolidation and on as large a scale as is possible, and in doing so to profit by the mistakes and experience of our predecessors; that a large consolidation could, by owning their own blast furnaces, rolling mills, bolt factories, malleable iron foundries, saw mills, &c., be relieved from many of the burdens now borne by us in the matter of procuring materials.

The drift of modern business enterprises, certainly in the manufacturing line, seems to tend toward consolidation and concentration. The union of many factories under one management, if properly directed, seems to offer advantages not possessed by separate organizations. It may be forced upon us in self defense sooner or later, but it is hardly within the province of this paper to elaborate further on such a remedy. I would, however, suggest that this association bring before the iron and

\* An address before the ninth annual convention of the National Association of Agricultural Implement and Vehicle Manufacturers, at Minneapolis, Minn.



steel producing companies the desirability of having their district managers, in receiving orders from their customers, forward them to the mills best adapted to execute them. Then immediately notify the buyer of the name of the mill at which his order has been placed, its mill number, the name of the superintendent, and let all future communications regarding it be carried on between the buyer and the superintendent. It would then be more direct, more businesslike, save valuable time and be more satisfactory than the present round-about plan.

I would also suggest that manufacturers, as far as is possible, standardize their material. Use the same sizes of angles, channels, axles, draw rods, drag bars, &c., so that the mills would have larger tonnage of these standard sizes and shapes and could roll and deliver them quicker than they now do a great variety.

I believe this standardization could be done without the loss of individuality or identity in the finished implements of the various factories.

It has also occurred to me that if the demand in this country is so far in excess of the supply that we can import iron and steel, as we are now doing, and pay a duty on bar iron, including flats not less than  $\frac{3}{8}$ -inch thick nor 1 inch wide, and on round iron not less than 7-16 inch in diameter, of \$13.44 per ton, and on round iron less than 7-16 inch in diameter of \$17.92 per ton, and on pig iron, scrap iron, &c., of \$4 per ton, it might be well to seriously consider the subject of temporarily abolishing the tariff on such articles for a specified period, until consumers shall have obtained some relief from conditions like those of the present, which are almost intolerable.

### United States Steel Improvements.

While no official statement has been made by the United States Steel Corporation in regard to improvements to be made to existing works and the building of new plants, yet it is understood that plans are under way for material changes to be made by the Carnegie Steel Company, including the building of a number of new mills. It is proposed to erect at Howard, near Homestead, where the Howard Axle Works are located, a very large sheared plate mill, a universal mill, an angle mill and a large open hearth steel plant, to contain 16 50-ton open hearth furnaces. It is stated that plans for these new mills and steel works are now being prepared, but as yet this has not been officially confirmed.

A fourth blast furnace is contemplated at the Ohio Works of the National Steel Company, at Youngstown, Ohio, and work on this new stack will likely be started early in the coming year.

Plans have been under way for some months and are nearly completed for the large new tube mill which is to be built by the National Tube Company at Lorain, Ohio. It is intended to make this one of the largest, if not the largest individual plant of the National Tube Company, and it is needless to say it will be equipped with every known modern device for the economical making of tubes. The steel will be supplied from the adjacent plant of the Lorain Steel Company.

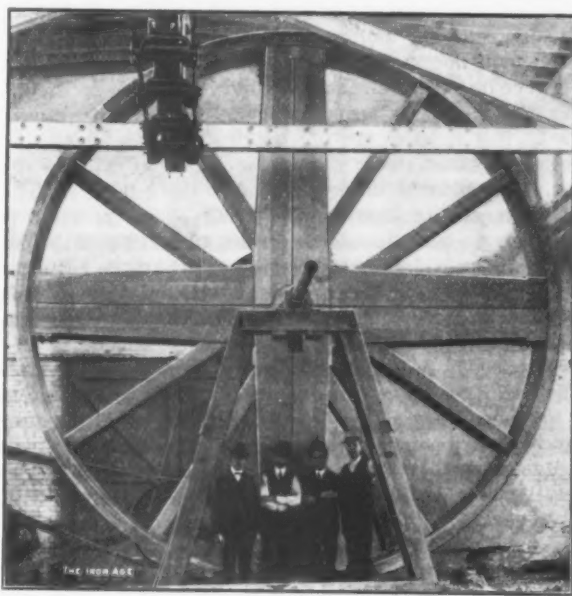
Some record breaking time has been made in the building of the two new blast furnaces under erection by the Carnegie Steel Company at Bessemer. These stacks are only 85 feet high, but are very wide at the bosh. Ground was broken for the two furnaces last June and it is confidently expected that one stack will be put in operation the first week in December and the second will follow early in the new year. The stacks will have a daily capacity of 500 to 600 tons each. The building of a blast furnace in the short space of six months is without parallel and establishes a new record in blast furnace construction.

At the close of the year it is probable that the Bessemer & Lake Erie Railroad, controlled by the Carnegie Steel Company, will have hauled to the blast furnaces of that concern in the Pittsburgh district upward of 4,000,000 tons of ore. In 1901 the ore tonnage of this

road was 3,662,000 tons. It is planned to bring fully 5,000,000 tons over the Bessemer road next year. Allowing 50 tons to the car and 40 cars to the train, this means 100,000 cars, or seven of these great ore trains for every day in the year. As a matter of fact, it means about 15 of these trains daily during the summer months, with a correspondingly smaller number of trains of less size for the winter months. Eleven new consolidation locomotives were added to the service this year, and ten of the same type have been ordered from the Pittsburgh works of the American Locomotive Company for 1903 delivery. The double tracking of the Bessemer road is to continue as fast as practicable and the yards will be correspondingly enlarged. The North Bessemer yards of the company have within the year been increased to a much larger capacity.

### Largest Wood Pulley Ever Built.

The Reeves Pulley Company of Columbus, Ind., recently built for the Taunton-New Bedford Copper Company of New Bedford, Mass., what is probably the largest wood pulley ever built. It measures 20 feet in diam-



LARGEST WOOD PULLEY EVER BUILT.

eter by 30 inches face and has an 18-inch bore. It was completed within 20 days after receipt of the order and shipped on October 16. An examination of our engraving will show that the men were placed in front of the pulley and not some distance in the rear, as is the usual practice in photographing large work.

### Painting Structural Iron.

John Murphy of Montreal writes to the *Painters' Magazine* as follows: The most effective method that I think of at present for the prevention of rust would be: After having cleaned the metal thoroughly from all loose dirt, scaling or grease, in the factory, to give a liberal coating of boiled oil, applied hot. This would find its way into all the crevices, cracks or holes in the iron, where paint could not enter on account of its thickness and incapability of running, not only in cracks and holes, but on perfect surfaces, where little lumps or roughnesses are found. If the painting is done carelessly the brush slips over these places and leaves around every little protuberance a mass, be it ever so small, perhaps imperceptible to ordinary eyesight, but sufficient to furnish a growing place for rust. I have never seen the process I recommend specified by any of our architects. I am sure that it would be a great improvement on the present method of painting iron, and it would furnish a fine preparation for future painting or covering with cement coating, such as has been suggested. To make "assurance doubly sure," I should recommend two coats of the hot oil instead of one.

## Vacuum Casting.

BY A. E. FAY.

The troubles which are experienced in trying to produce sound metal castings have led to the expenditure of a large amount of inventive energy. Much of it has been sadly misplaced and there is no more striking example of this than the vacuum casting idea. Although there are undoubtedly uses for the vacuum in casting, yet the main idea is erroneous. The mere exhaustion of the air from the surface of the metal in the mold will not in any way prevent blowholes or pipes. The idea was founded upon the assumption that a vacuum has energy of some kind which will operate to liberate gases from the metal. One of the least controllable difficulties met with in the art is the imprisonment of gases in the metal as it solidifies. Many ways of mitigating this difficulty have been tried, the most successful in practice being the application of pressure, and the least successful the reduction of the pressure.

Suppose the metal in a mold to be in the act of solidifying and a bubble of gas to have been formed somewhere in its interior. If great pressure is applied to the surface of the molten metal the effect on the bubble of gas will necessarily be to compress it and therefore to reduce its size. The gas being more easily compressible than the metal, its size will usually be greatly diminished. But suppose the opposite course is adopted and the air is exhausted from the mold, what will be the result? Obviously the opposite and the bubble or hole will be larger, though not greatly so, as the pressure is not likely to be reduced more than 10 or 12 pounds per square inch. Of course, this is not what the inventor wants. His idea is that the pressure being reduced, this bubble will more easily reach the surface of the metal and leave the casting. But upon what theory is this belief based? A vacuum has no properties, or at least only negative ones. An exhausted space cannot exert an influence upon a particle of gas in the metal to cause it to become disengaged from the metal. The only force to cause these particles of gas to escape is gravity. The metal, being heavier, sinks, forcing the gas upward. Those particles of gas which rise before the metal solidifies above them finally escape, and the only method of getting more of them out is to make them rise faster, or keep the metal in a molten condition longer. How will a vacuum accomplish such a result as this? Is the vacuum supposed to reach down and pull the gases out? When these bubbles were in the interior of the casting they were under great pressure, due partly to the heat and partly to the head of liquid metal above them. As they rise and approach the surface both these factors are reduced and finally the latter disappears. When the bubble is separated from the surface by a film of metal only, comes the time when the vacuum can be of service. If there is air in the mold above the metal it exerts a pressure on its surface, and if it is confined in the mold that pressure becomes large owing to the heat. Of course, this pressure tends to prevent the bubble of gas from breaking through, and if it were removed the pressure in the bubble would cause it to come through more easily. This pressure of the air above the metal, however, cannot act below the surface to retard the movements of the gas in the molten metal itself. The vacuum may therefore lessen the number of scabs, but it will have no desirable effect on interior blowholes.

These things are no doubt pretty well understood now, and yet some of the inventions which have been made even recently show signs of a disregard of the simplest rules of physics. Some enthusiasts even go so far as to assert that the vacuum improves the quality of the metal. Although up to date the application of pressure to the metal while solidifying has been more successful than any other method of reducing blowholes, pipes, &c., it is obvious that a perfect casting cannot be produced by that method alone. The cavities may be greatly reduced in size, but they cannot be entirely removed by pressure. The gas is there, and although it may be compressed to exceedingly small compass, it cannot be destroyed, nor will it be forced entirely out

of the casting. The pipe in the top of an ingot is a different matter. It may be completely closed up and the gases expelled, and yet a flaw may exist. The pipe cannot be prevented. It must first form. Then it may be closed up. But if this does not occur before the inside surfaces of the cavity get beyond the plastic stage they will not weld together and a flaw exists in the ingot which will not be removed by subsequent working.

With the pipe difficulty, however, this paper will not concern itself to any great extent, for the only probable effect the vacuum can have on it is to prevent the oxidation of the surfaces. This is of some importance, especially where pressure is used in conjunction with the vacuum, and will be referred to later.

There are two legitimate uses for the vacuum in casting.

1. The removal of the air from the mold before introducing the metal will not only enable the metal to immediately fill all small angles and fine lines in the mold, but it will avoid the necessity of pouring the metal in a stream down through the air, thus inevitably causing the latter to mix with it.

2. By pouring the metal through an exhausted space in such a way as to expose a large surface of the metal the occluded gases will have a chance to expand and leave the metal as they are brought to the surface, and especially if the space is being drawn upon for more air by an exhausting apparatus there will be no tendency for them to be taken up again by the metal.

The exhaustion of the mold before pouring, without attention to freeing of the metal from gases as it is poured, will obviously not be of much use in casting ingots or any articles designed for heavy service, but it is useful when the chief aim is perfection of surface, because the only effects it can have are to render the outline more distinct and prevent scabs. The removal of the gases from the metal before it enters the mold in the manner mentioned above, however, is a matter that may be of great importance in the production of all kinds of castings, especially those destined for service where a hidden flaw may cause serious damage.

### Early Inventions.

It has been stated that methods of exhausting air from fluid metal were known and effectively applied in the primitive practices of ancient China and Japan, and probably Greece. How much authority there is for this I do not at present know, but if anything of the kind was done it was probably in the casting of works of art and small articles. Professor Howe did not know of any such processes, for he states that casting in vacuum was proposed by Louis Nessel in 1877 (*Oestr. Zeits.*, No. 43, 1877, and *Met. Rev.*, I, p. 494). An article in *The Iron Age*, May 23, 1878, also seems to give the credit for casting steel in vacuum to him. Nessel's idea was perfectly useless. Moreover, he was half a century later than the pioneer and 20 years later than Bessemer. The *Mining and Scientific Press* stated on the editorial page so late as June 17, 1899: "The latest in the world of practical science is the effort of Professor Dewar of London to cast steel in a vacuum, by which means it is thought gas bubbles and blowholes will be avoided," as if it were a new proposition. But the first suggestion of the principle so far as available records go was in 1825, when William Church of Birmingham, England, patented his "Improvements in casting cylinders, tubes and other articles of iron, copper and other metals, designed to render such castings more perfect, sound and free from air holes, and at the same time more compact and uniform in texture than such castings have heretofore been, and in which process I am enabled to effect a more uniform case hardened surface when required." The apparatus consisted of a mold suspended from a crane above a "metal chest," both the mold and chest being connected to an air pump. From the bottom of the mold extended a short tube of refractory material closed at the bottom by a cap of sheet iron, or other metal, all being tightly sealed, of course. The "metal chest" was provided with a cover which could be made air tight. The crucible of molten metal was to be placed in this chest, the air exhausted from the mold, the mold placed over the chest, with the tube in its bottom projecting



down into the metal, and everything sealed air tight. The metal was to enter the mold upon the melting of the cap on the lower end of the tube, but to prevent an inrush of metal at this time the air was exhausted from the chest. Then the connections were changed, so that the air pump would force air into the chest under pressure and continue to withdraw air from the mold. The metal was then to be forced under pressure into the exhausted mold. The process is not further explained, but his particular claim to novelty consisted "in the combination of apparatus by which I am enabled to exhaust the mold and to preserve it in an exhausted state, and also to allow the melted metal to flow gently into the mold, by which apparatus I am likewise enabled to give any desired pressure to the melted metal while in a fluid state and thereby produce a more perfect casting." His illustration relates to the casting of chilled rolls and the like. This process was probably never tried in practice, nor did it attract any attention, for it was a quarter of a century before any one else attempted to cast large articles in a vacuum.

#### Sir Henry Bessemer.

The second person to suggest vacuum casting was, however, no less a celebrity than Sir Henry Bessemer, although he was at that time only 25 years old and unknown to fame and title. It is well known that his father was at one time a type founder and that he in his younger days engaged in that occupation. In 1833 his energetic mind conceived a type casting machine which has furnished ideas for the casting of type and other small articles from that time to this. He provided means for withdrawing the air from the molds before casting and, according to Jeans ("The Creators of the Age of Steel"), the machine produced the most accurate type cast up to that time, but was finally abandoned on account of a defect in the injecting valve. This was the first invention that Bessemer patented, but not his first invention.

#### Julian Bernard.

The next to suggest the idea was one Julian Bernard, who received a British patent in 1853. He was going to apply it to iron, copper, brass, gutta percha, caoutchouc porcelain and earthenware of all kinds. A bottom pour ladle was placed above the mold, and after exhaustion of the mold the metal let in. This, he said, produced a superior surface and sharpness of outline and freedom from air bubbles or impurities of any kind, but did not attempt to explain the action. Both Church and Bernard provided means to prevent the metal rising far enough to enter the pipes to the exhaust apparatus. Church's was automatically operated by the rising metal, but Bernard's was merely an indicator. George Bell and Robert Luthuy of Bolton, England, adopted Bernard's device about ten years later. They either exhausted the air from the mold directly or put it in a chamber which could be exhausted. They explained the theory more fully than their predecessors, stating that it prevented the introduction of air by mixing, as the metal flowed into the mold and presented a greater surface to the vacuum, both in the descending stream and in the constantly changing upper surface of the metal in the mold. This idea was very attractive to iron and steel men and was tried for Bessemer and other steels, especially to remove the air brought in by the blowing process and to reduce oxidization, by Critchlow and Kidd of Baldwin, Pa., in 1875; Russell Aitken of London, in 1882; W. M. Cooper of Allegheny, Pa., in 1888; W. F. Durfee and N. B. Wittman of Birdsboro, Pa., in 1891, and others.

#### Ezra Ripley.

The first in America to suggest the idea of casting in a vacuum seems to have been Ezra Ripley of Troy, who received a patent in 1856. The chief idea was to cast by the force of atmospheric pressure without having such a complicated exhausting apparatus as Church's. He removed the air from the mold suddenly, while the inlet of the mold was under the surface of the molten metal, to expeditiously cast small articles like paper and letter seals, stamps, type, ornaments, clock gearing and various articles of hardware, free from blows, strains, flaws, &c., and with sharp edges. The exhausting appa-

ratus shown was a chamber composed of two heads, connected by a flexible diaphragm and containing a spring to force them apart. Sir Henry Bessemer contemplated adopting this idea and described it in a patent on making Bessemer steel in the same year.

In 1865 Johnson suggested connecting a hollow core or mold wall to an air pump for ventilating purposes, and a similar proposition was made in France a few years later by Cumin and Martel. Ripley's method was tried by Wm. Sellers of Philadelphia in 1872 in the casting of ingots, but he modified it to the extent of drawing the metal out through a pipe into the mold, instead of placing the mold over the molten metal. He used a steam jet ejector for exhaustion and exhausted until the gauge showed a vacuum of 22 inches, but he does not seem to have had any success. He also suggested using the method with ordinary sand molds. He said the method was especially applicable to alloys in zinc, copper, iron and tin, which rapidly oxidize by being exposed to the air in a molten state. The chief object seems to have been the method of transferring the metal from the furnace or crucible without the use of a ladle and without removing the crucible from the furnace. In 1873 H. A. Levallois suggested casting a nickel tungsten steel in vacuo.

Another famous name, that of Benjamin T. Babbitt, is connected with this idea, he having paid the fees on three patents in 1878 and 1880 for casting steel ingots, chilled iron rolls and gun barrels. His idea, however, seems to have been to exhaust after pouring, which, as has been said, is useless.

#### Robert Mueller.

Robert Mueller of Dortmund invented one of the most ingenious devices of this character which has ever been contrived. A sand mold for a hollow article was made, as usual for vertical casting, but the core was provided with a central tube having numerous small passages communicating with the mold cavity and also having a piston tightly fitting the tube and adapted to be raised by a chain depending from above to exhaust the air in the lower part of the tube, and therefore from the core and mold. The ingenuity lay in the method of automatically raising this piston so as to keep it always at about the level of the metal in the mold. The bottom pouring gate had a duplicate riser, on the surface of which rested a float, which, of course, would rise just as fast as the level of the metal in the riser and mold. This float was attached to the end of a chain passing over a pulley and thence over a windlass operated by a suspended weight. As the float rose the weight was free to fall, and in doing so wound up the chain supporting the piston in the tube in the core. The ingenuity of this invention seems to be its only recommendation.

The Taussig system of smelting and casting metals in vacuum was described in *The Iron Age*, April 20, 1893, and need not be further described here, as it was chiefly the electrical feature that was notable. It was stated, however, that numerous metals, including even platinum, were cast free from pores and bubbles by this process. It was operated at Bahrenfeld, in Germany, but I believe it has not been heard of lately in this country.

Among other things vacuum casting has been tried in the manufacture of battery plates by E. W. Timmins of London and has been time and again experimented with for casting dental plates of aluminum and its alloys.

McCarty suggested a use for vacuum casting 13 years ago which is somewhat analogous to using it to prevent oxidization of the pipe in ingots. In casting compound ingots he exhausted the mold to prevent oxidization of the exposed surface of the metal on which the molten metal was to be cast. John W. Anderson of Allegheny, Pa., has recently suggested the same thing in one of his patents on making compound ingots for armor plate.

#### Michael Smith.

The most successful of the earlier vacuum casting devices was that invented by Michael Smith of Philadelphia in 1867. His chief improvement lay in combining positive mechanical pressure on the metal with the



good effects of the vacuum, thus going only a little further than the pioneer Church had gone. It was designed for casting small objects of refractory metals, although monumental tablets, 7 feet 6 inches by 3 feet 6 inches and  $\frac{1}{4}$  inch thick, were cast by it, and it has been used for aluminum, bronze, brass and even steel. It was exhibited at a *conversazione* of the British Institution of Civil Engineers and enthusiastically described in *Engineering* in June, 1870. The Gorhams of New York had the exclusive rights for casting sterling silver, while the Passaic Art Company had all the other rights (*The Iron Age*, September 8, 1892), although the patents were originally exploited by the Smith Metallic Compression Casting Company of Boston. An air tight flask was used, in which was placed the mold, formed of plaster of paris, or other refractory material or composition. The air was then exhausted from the flask and the metal forced in. The metal was contained in a cylinder provided with a plunger and separated from the passage to the mold by a plug or tamp of clay. When the air was sufficiently exhausted the plunger was operated and the clay plug was thus suddenly broken, which injected the metal into the mold "with such force as to pack the metal at once closely into the various cavities prepared for it," and the pressure was continued until the molds and sprues were entirely filled. It was improved by John J. C. Smith and Victor E. Smith in 1891. This was designed with special references to casting ornamental ware of German silver and other metals. All the principles of the earlier patents were retained, particular stress being laid upon the "collection and temporary retention of the entire charge of molten metal in a suitable holder above the molds" and "the prompt, rapid, and continuous transfer of the purely metallic portions of the entire body of molten metal from the bottom of such holder to the matrix cavities, leaving the impurities in the sprue, while increasing the pressure at the rear and decreasing it at the front of the advancing stream of molten metal." Another improvement was made by J. J. C. and E. C. Smith in 1894. J. J. C. Smith suggested applying the principle to a rotary casting machine, which was fully illustrated and described in *Engineering* in February, 1870.

#### Curtis H. Veeder.

This idea, originated by Church and perfected by Smith, was taken up by Frederick Wicks 20 years ago and applied to his now famous type casting machine, and has lately been adapted by Curtis H. Veeder of Hartford, Conn. A year or two ago Mr. Veeder perfected several automatic machines for making small castings in metal molds. This idea has recently been brought into very successful operation and bids fair to soon become one of great importance. Veeder is the latest inventor in this line and one of the most ingenious. He has brought out nothing new so far as the present subject is concerned over Smith's process. He, however, has devised a new form of exhausting apparatus consisting of two pumps working so as to obtain an almost perfect vacuum. This idea was hinted at by J. S. Williams of Riverton, N. J., in 1884, and W. Ellis May has been using a similar arrangement, which will be referred to later.

#### Removing Blowholes.

Although the idea of first removing the air from the mold and then introducing the metal under pressure, thus properly combining the benefits of two supposedly antagonistic ideas, has proved very valuable for casting small articles, the problem of removing the blowholes from ingots and castings made for strength was not to be solved so simply. The surface of the castings might be almost perfect and their interior structure greatly improved, but they were by no means flawless. The reasons for this are stated above. There is another step that must be taken—that is, to remove the cause of the blowholes by taking the gases out of the molten metal and effectually preventing the occlusion of any more. It was seen early that this ought to be accomplished by passing the metal through an exhausted space in such a way as to expose a large and constantly changing sur-

face to conditions favorable to the disengagement of the gases.

The first idea was to maintain a vacuum within the furnace or part containing the molten metal. John Absterdam of New York originated this idea in 1866. His chief thought, however, was to remove impurities in gaseous form, and he does not seem to have gone further than that. John F. Bennett tried to apply the same idea to glass metallic oxides and metalloids as well as metals, in 1872. He said: "The exhaustion of the air from the surface will, as approach is made to a perfect vacuum, so far relieve the pressure which facilitates a cohesive union between the metal and its gaseous impurities as that such union will be practically overcome and the gases will be removed and exhausted off from the entire mass."

In 1882 R. H. Gordon of Reading, Pa., proposed exhausting the air from the puddling furnace before pouring, and the next year Pielsticker and Mueller of London, England, and Brandenburg, Germany, respectively, suggested placing the metal in a molten state in a shallow vessel, rotating at such speed in a vacuum as to throw the metal over the rim of the vessel in a thin stream. Centrifugal action was supposed to be the chief agent in eliminating the gases.

J. T. Wainwright of Chicago devised an apparatus for exposing a large surface of metal to a vacuum in pouring. The metal was forced to rise in a cylinder and pass over a dam therein in the vacuum chamber located in a conduit between the receiving and outlet ends.

These methods were no improvement on a simple idea suggested by John Bourne in 1877. He introduced the metal into the mold in a state of minute subdivision, caused by letting it run through perforations in a fire clay block to permit a greater surface of the metal to be "exposed to the vacuum." One peculiar statement he made was: "The exhaustion may be produced by the hydrostatic gravitation of a column of molten metal itself." This is a remarkable modification of the Lorrillian vacuum and mercury barometer. W. H. Masser of Los Angeles again brought Bourne's idea up 12 years ago, using a porous slab, instead of a perforated one, and relying, he said, on the pressure of the atmosphere above in addition to the weight of the metal to force it through. He says that the process of compressing steel is the exact opposite of his and is fallacious because it does not remove the cause of the trouble. Russell Aitken suggested passing the metal into an exhausted receptacle in a similar manner about 20 years ago. But he intended to break the falling metal up into fine streams or a spray and suggested repeating the operation a sufficient number of times to free the metal from gases.

#### W. Ellis May.

All these men were attempting to cast ingots of Bessemer or other metal. This idea has been modified and improved by an English engineer, W. Ellis May of Bolton. His method, while devised for the same purpose as those of Bourne, Pielsticker, Wainwright and Masser, seems more natural and is more practical. He inclosed the mold, of course, in a vacuum chamber and admits the metal to a broad and shallow runner or trough, located in the vacuum chamber. He intends that the metal shall be 1 inch or less deep in the runner and run to the mold as slowly as possible, so that the greatest amount of it shall be "exposed to the vacuum" for the greatest length of time possible. Of course, this would be undesirable in the air, but to get any effect from a vacuum something equivalent to this must be adopted, and Mr. May's plan seems preferable to those mentioned above. One peculiar thing alleged by him is that while in vacuo molten metal seems hotter and more liquid, taking longer to cool. The absence of the air to conduct the heat away would no doubt tend to have the effect of keeping the metal hot and liquid for a longer time, and if this effect is sufficient to be noticeable, it is an advantage, for the metal can be exposed longer in the runner. The breaking up of the stream by letting the metal drop from the end of one runner into another before it reaches the mold should add to the beneficial effect. He employs a series of "store vacuum cham-

bers," which can be connected with the main vacuum chamber in succession to insure a good vacuum. This is somewhat similar to Williams' and Veeder's idea of having two pumps, but pumping the air directly from the mold seems adequate only in casting small articles, more rapid action being necessary in ingot casting. These ideas were brought out about 11 years ago and the inventor has since improved the exhausting apparatus and added a compressor. The use of a compressor might at first sight seem to be a confession that the vacuum did not work as claimed, but it must be remembered that exhaustion cannot prevent shrinkage, and therefore a pipe must form in the ingot, and "liquid compression" is the best way to close it up and weld the ingot solidly together. Exhaustion prevents oxidization and thus assists this welding. This combination of processes, of course, avoids or reduces the waste caused by cutting off the tops of ingots (*The Iron Age*, September 30, 1897). The process was described in the above mentioned issue of this paper and need not be further described now. It has been successfully tested, Mr. May states, for small ingots, but the tests made under the auspices of the Ellis May Vacuum Steel Syndicate on larger ingots have not been so successful. In justice to him, however, it must be said that he has made a good showing and that these latter tests, which were carried out in his absence, were not made according to his plans and departed from his process in several important particulars. So the practical value of the process may be considered to be still unknown. It seems, however, that he has the right idea as far as theory goes, and if it can be carried out perfectly and without too great cost it should finally succeed. By preventing the entrance of air and gases and removing most of those already in the metal he does away with practically all the cause of blowholes, and by preventing oxidization of the surfaces of the pipe, and then compressing the ingot so as to weld it together, that trouble should be greatly mitigated. Small holes with oxidized surfaces which render them unweldable should thus be prevented in ingots, and when it is seen that this is important enough to warrant the necessary expenditure of money, adequate tests at least will no doubt be made.

### The Lunkenheimer Company's New Factory.

The Lunkenheimer Company of Cincinnati, Ohio, manufacturers of brass and iron goods and specialties for engines, boilers, &c., such as brass and iron valves, whistles, injectors, lubricators, oil and grease cups, &c., on Saturday, October 25, formally opened their new works to about 3000 visitors and friends, and are now moving from their old quarters on Eighth street.

The buildings, of which there are five, represent an investment of over \$300,000, consisting of the main building, occupied by the brass department, with adjoining buildings for the iron department, brass foundry, power building and office building. All are of pressed brick and steel construction of modern type. They occupy about 3 acres of ground and have switching facilities, 3 acres of additional ground providing for future extension of the business.

These works are located near Brighton station, in a section of the city called Fairmount, within 2 miles of the center of the city. It has been the aim of the company to construct the model plant in this industry and many new and interesting features are noticeable. The main building, 130 x 180 feet, is of gallery style construction, with a center area measuring 30 x 80 feet, is three stories high, and built so that three more stories can be added without interfering with the operation of the business. The elevators and iron staircases are arranged within the center area. All buildings are designed for 300 pounds per square foot floor load. The roofs are glass and clay tiling of Ludowici interlocking type.

A novel feature in the main building is the heating system, inasmuch as the hot air travels through the 14 large hollow columns which support the floors around the area in the center of the building. These columns have openings on each floor to distribute the

air; the bases of the columns being connected with a huge fan by means of tunnels under the basement floor. By this construction the usual galvanized iron air pipes are done away with, adding greatly to the simplicity of the building. The type of window used is a novel one, having a blind arrangement that is of great advantage during summer weather.

The foundry is equipped with modern appliances, such as overhead track system for carrying material, smelting furnaces burning crude oil, and many pneumatic appliances, such as are used in the latest foundry practice. The general distribution of power throughout the buildings is of the latest design. The source of energy is a 300 horse-power compound engine, which drives a 240-k.w., three-phase, 220-volt General Electric alternating current dynamo. The current is led out from a switchboard to the different parts of the buildings, where suitable motors (principally attached to the ceiling) are provided to drive the various lines of shafting. These motors are of the Westinghouse and General Electric induction type without commutators or brushes. The power from the motors to the shafts is transmitted through what is known as the Renold silent chain gear, which permits of a very compact arrangement without noise or friction and dispenses with leather belts.

The engine room is also provided with a large cross compound two-stage Laidlaw-Dunn-Gordon air compressor, which supplies compressed air throughout shops and foundry for driving pneumatic tools, holsts, &c. The boilers are Babcock & Wilcox, with automatic stokers. The engine room, the floor of which is laid in mosaic tiling, is considered one of the handsomest in the country. The company manufacturing the engine and boiler fittings aimed to have a power plant strictly up to date and of handsome appearance.

Bell telephones connect all departments to a central exchange, which connects with the city lines, thus affording immediate communication from any point in the works.

The illumination is furnished by what is known as the Nernst lamp, made by the Nernst Lamp Company of Pittsburgh. This lamp has been going through a process of development for a number of years and is now past the experimental stage and is being adopted throughout this and many foreign countries. The quality of light differs from that produced by any other artificial means, inasmuch as it more closely resembles sunlight than gas, incandescent or arc light, and articles exhibited under it have their true color value. Owing to the arrangement of the lamps, the distribution of the light is absolutely even and without shadows. The lamps are so arranged that sufficient illumination is secured without providing each operator with an individual light.

The office building is a three-story pressed brick structure, 50 x 80 feet, with modern equipment, the second floor being occupied by the drafting and engineering departments, and the third by the advertising department as well as a laboratory and photograph gallery.

The business was founded in 1862 by the late Frederick Lunkenheimer, and has grown to large proportions, now employing over 700 men. With increased facilities the company expect to extend their line and take up many new engineering specialties. Their trade is both domestic and foreign, and is distributed largely through jobbers, but they also have a branch store in London, England, and an office in New York City. The company have placed many orders for additional tools and machinery, which are being installed in their new quarters.

**Dover Furnace Revived.**—Dover furnace, in Stewart County, Tenn., which has been idle since 1874, has been completely remodeled and will be blown in about January 1 by the Dover Iron Company, who also operate Bear Spring furnace. The same ores will also be used in producing Dover iron, and the greater part of the product of both stacks has already been sold to chilled roll foundries for 1903.



### A Modern French Blast Furnace.

The famous firm of Schneider & Co. decided some time since to erect a plant at tidewater, and chose the port of Cette on the Mediterranean, in close proximity to the Southern canal and to the canal from Cette to

principle has been adopted of hoisting above the furnace top buckets with drop bottoms, which may be conveyed either to the fuel or to the ore yards. In this manner the handling through the intermediary of a skip, which is used in American furnaces, has been avoided. The coke and ore buckets are brought by

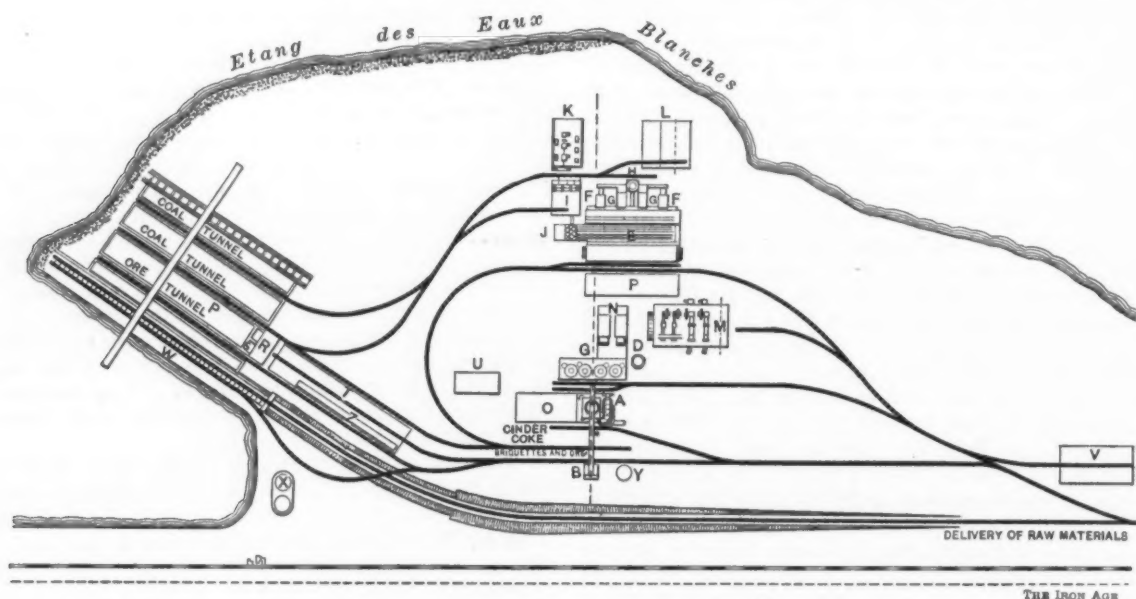


Fig. 1.—General Plan of the Cette Furnace Plant.

the Rhone. Connections are secured, too, with the Paris, Lyon and Mediterranean and the Midi roads.

They began with the erection of one blast furnace, but it is the purpose to build additional stacks and to erect works for the conversion of the metal into finished products. Cette also has the advantage of being in close

electric locomotives to the furnace hoist, which raises them and conveys them above the furnace top. There they are automatically dumped.

The products of the blast furnace are taken care of on two lines of track. The pig iron flows into two ladle cars, which are brought by a steam locomotive to the

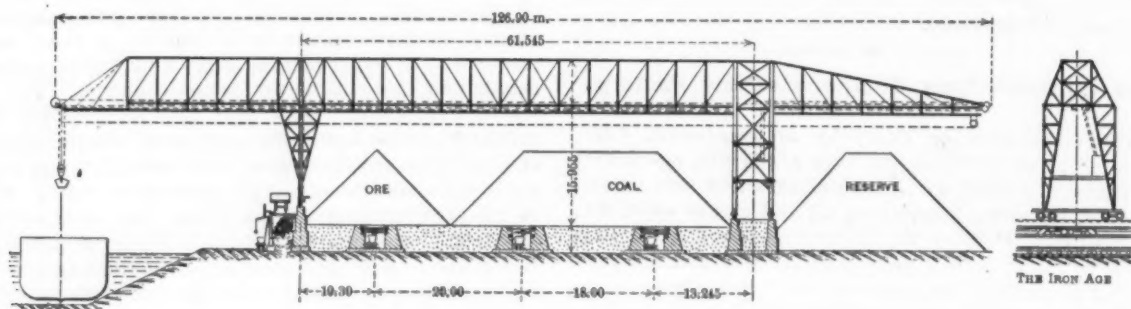


Fig. 2.—Handling Stock at the Cette Furnace.

proximity to the ore deposits of the Pyrenees and of Spain, although it suffers from the disadvantage that the ground is but little elevated above the water, which made foundations a difficult matter.

The general layout of the plant in operation is shown in the accompanying general plan, Fig. 1, which indicates the location of the stock yards at P, close to the port of the works, which latter is to be connected with the sea and is capable of receiving seagoing ships. The raw materials arrive either by sea or by rail, in the latter case being drawn up along the inclined plane W. Some of the materials must undergo preparation before being delivered to the blast furnace. The coal must be converted into coke and fine ores must be briquetted; therefore a battery of coke ovens is arranged at E, with a plant for grinding and mixing the coal and with boilers utilizing the waste heat. A plant is also located at T for briquetting about 200 tons per day of fine ore. Besides this a stock yard for coke has been provided at P, for such fuel as arrives by rail. This yard is so arranged that the coke may be delivered directly into the furnace charging buckets.

The charging of the blast furnace has been so arranged as to avoid handling as much as possible. The

cast house placed at V. Cinder is handled on a track on the opposite side of the furnace.

The blast is supplied by a group of blowing engines, M, and is heated in stoves. The necessary steam for the blowing engines is furnished by a group of boilers, N, heated by blast furnace gas, or by boilers, F G,

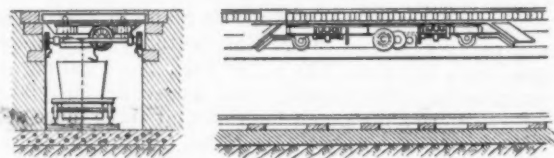


Fig. 3.—Longitudinal and Cross Section of Stock Tunnel.

heated by waste gas from the coke ovens. The latter supply also an electric station, K, which furnishes electrical power for the whole plant.

The waste gas from the blast furnace is utilized either for heating the Cowper stoves, for raising steam in the boilers N, or for directly operating gas blowing engines, M. Under normal conditions these gas blowing

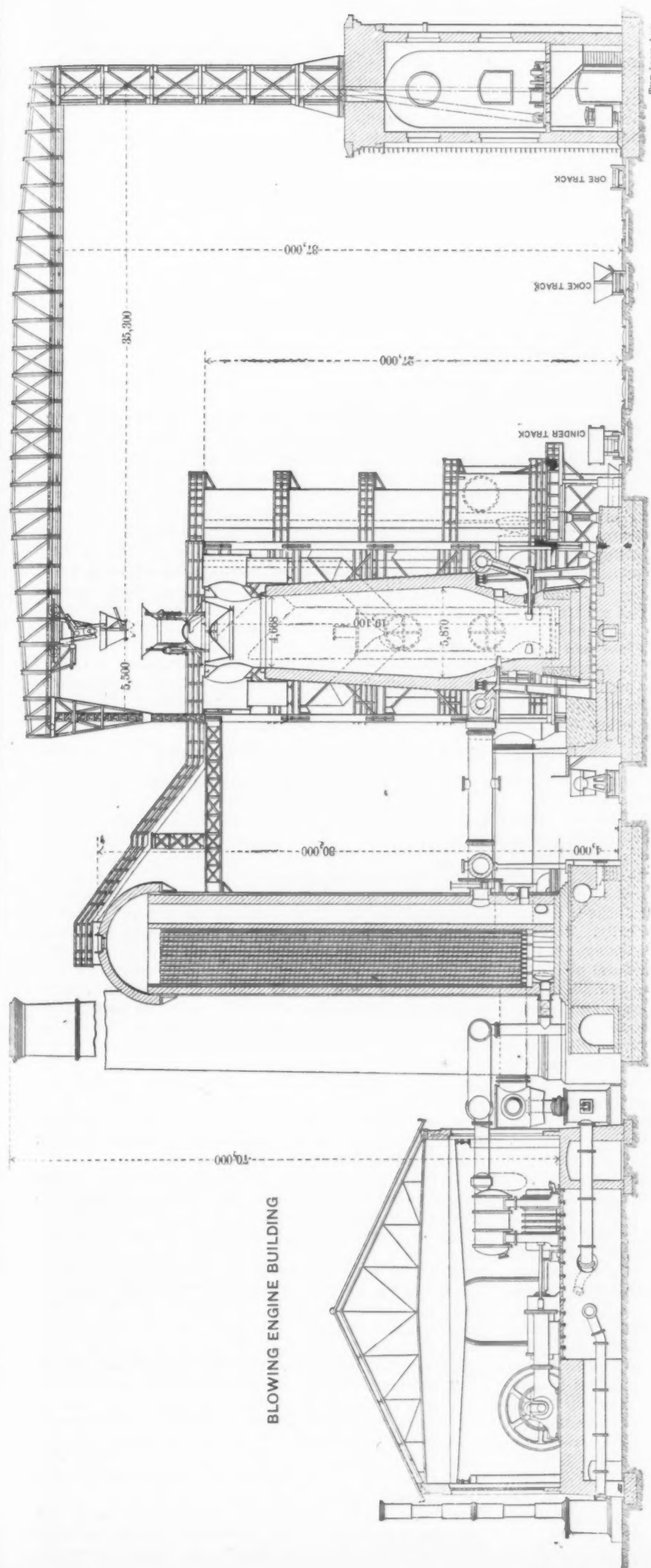


Fig. 5.—Section through Blast Furnace, Showing Stock Hoist, Stoves and Blowing Engines.

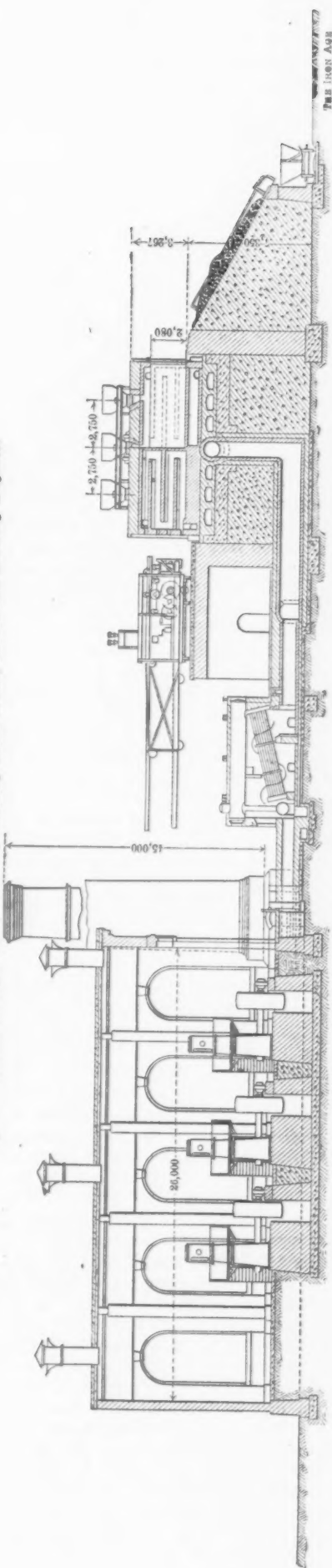


Fig. 4.—Section through Coke Ovens and Electric Plant.



engines serve the furnace, but there are also blowing engines operated by steam, which are held in reserve in case of failure of a gas supply or during the time when work is resumed after stoppages.

Sweet water being scarce at Cette, sea water is employed for cooling the tuyeres and the bosh plates. It is supplied by electrical centrifugal pumps, which deliver into reservoirs, X, having a capacity of 10,600 cubic feet. All the steam from the steam engines is carried to a group of surface condensers placed in the electric station K.

This being the general arrangement, some details are submitted concerning the salient points of the plant. The stock yard for raw materials is shown in Figs. 2 and 3. There are two unloading machines which cover the vessels and the stock yards proper, the dimensions being shown in the drawings. They span the stock yard, under which there are three tunnels with a roof composed of conveyors. Along the dock are pockets to receive the daily arrival of ore or coal by rail, which are dropped directly into the charging buckets. The roof of the tunnel under the stock yards is formed by two double T's, sliding in a horizontal groove. A distributor operated by electricity moves below the roof and makes it possible to displace the material at the edge of the heaps. When the tunnel is entirely uncovered of ore or coal it is supplied by drag buckets operating from the main unloading apparatus. The unloading is done by electric motor, the hoisting speed being 100 feet per minute, and the speed of delivery over the stock yard being 400 feet per minute.

The coke oven plant, Fig. 4, consists of a battery of 36 Belgian ovens, 29.5 feet long, 8.2 feet high and 17.75 inches average width. They are placed 16.4 feet above the general level in order to discharge their coke upon an inclined plane, from which it slides easily into the coke buckets. The coal is first ground and mixed, the plant being driven electrically. The coke charging buckets are coupled in sets of three so that the ovens are charging simultaneously at three points from the drop bottom cars. The waste heat is utilized in four boilers, two of which are tubular and two of the marine type.

The fine ores are briquetted in a shop, R, equipped with Couffinal press with a capacity of 50 tons of briquettes per 10 hours, and with a heating canal in which the briquettes can be dried and baked. The press is operated by a 60 horse-power electric motor. The drying tunnel, which is heated with blast furnace gas, is equipped with a blower operated electrically. The briquetting machine yields briquettes weighing about 3 kilogrammes, which are placed on a platform above the main truck and thence dropped into the charging buckets. The shop is arranged for two presses and is supplied with fine ore, blue billy, &c., from a stock bin capable of holding 300 tons. This bin is within the range of one of the unloading cranes. The characteristic feature of the plant, however, is the arrangement for delivering stock to the furnaces. All the material is brought under the stationary stock crane, shown in Fig. 5, the coke and ore buckets resting loosely on the trucks. They are picked up by the crane, hoisted and conveyed to a point above the tunnel head, where an automatic apparatus drops the bottoms. The height of this crane is 115 feet above the general level.

The blast furnace, which is shown in Fig. 5, has a daily capacity of 200 tons. It is 75.46 feet high, 19.68 feet bosh and 13.1 feet in the crucible. The cubical contents are 360 cubic metres. It is blown by eight tuyeres and may be supplied with blast also by a second series of eight tuyeres placed at a higher level. The top has a double cone and is so designed that individual parts of it can be very readily carried off or replaced by means of the charging crane. The belts are operated hydraulically from the stock elevator house. The top is carried directly by the steel frame work surrounding the furnace, so that the latter may expand or contract freely, there being a sand seal. The downcomer has two branches, which deliver into a Silesian dust catcher, thence are delivered to a Theisen gas cleaner, thence going to the hot blast stoves, the boilers or the blowing engines.

The bosh, heavily reinforced, rests upon eight cast iron

columns, which are supported on the lower platform upon which the crucible rests. The stack is supplied with numerous cooling plates in which sea water circulates. The tuyeres receive their supply of sea water from four tanks placed on the uppermost platform, near the tunnel head.

The crucible is surrounded with heavy cast steel plates, which are sprinkled, and rests upon a cast iron platform supported by a series of I-beams placed upon the foundation. Air freely circulates under it. The tap hole is so arranged that the furnace may deliver simultaneously into two ladle cars of 15 tons each. It is possible also to cast upon a bed near the furnace, which will also take clinder. The latter is tapped into ladles or is granulated.

The Cowper stoves are 98.4 feet high and 21.3 feet in diameter, there being four of them. The valves are made of water cooled bronze castings. A stack 246 feet high serves the Cowper stoves. The foundations were made on piles with concrete, and in spite of the weight have shown no movement.

There are two blast furnace gas blowing engines of the Delamarre-Debouteville type of 600 horse-power. As a reserve there are two 300 horse-power Corliss blowing engines formerly in use at the Creusot works. These engines are to be used during blowing in to avoid unsettling a complicated system of producers, &c.

The liquid iron is carried in ladle cars to the cast house, which is situated at the end of the line of furnaces projected. This cast house is served by a 6-ton electric crane, the ladle cars delivering either to the right or to the left.

The electric central station has three sets; each consists of a Weyler Corliss 300 horse-power condensing engine running at a speed of 160 revolutions. It drives trains intermediary by belting, a 250-kw. Schneider dynamo and furnishes a 500-volt current.

### The Status of the Cuban Reciprocity Convention.

WASHINGTON, D. C., November 4, 1902.—The recent press dispatches from Havana stating that the Cuban reciprocity convention has been pronounced unsatisfactory in its present form and has been returned to Washington by President Palma are confirmed by a cablegram from Minister Squiers, and the arrival of the treaty here is daily expected. The conclusion, rather prematurely reached by the Havana correspondents, that this action on the part of the Cuban Government is equivalent to the final rejection of the treaty is asserted by the State Department officials to be wholly erroneous, and the return of the treaty is said to mark an anticipated step in the negotiations which will probably be followed by the abatement of certain demands of the United States for concessions on American products entering the islands. It is believed that the general form of the treaty is entirely acceptable to President Palma, and that its terms can be made satisfactory without sacrificing the interests of American exporters or pledging the State Department to concessions on behalf of Cuba which the Senate would be apt to reject.

In its present form the convention concedes a reduction of 20 per cent. in the tariff on all products imported from Cuba, the alternative of 25 per cent. on certain items as originally proposed having been withdrawn. In return it is proposed that Cuba shall grant a differential in favor of American products which is described as "a nominal 25 per cent.," but which is calculated by experts at from 30 to 35 per cent. The concessions range from 10 to 60 per cent., but the reduction on so many items approximates 50 per cent. that the average is considerably higher than was at first announced.

These figures furnish the necessary clue to the motive of President Palma in declining to accept the treaty in its present form. The island is asked to make concessions averaging 30 or 35 per cent. in exchange for a flat reduction of 20 per cent. Not only is the average concession in favor of the United States much larger than that granted to Cuba, but the differential is so manipulated as to provide the greatest reduction on those commodities which American exporters are finding the greatest difficulty in introducing into the island. It is not

surprising, therefore, that President Palma and his associates should point out the inequity of the proposed arrangement, which they have emphasized by calling attention to the fact that Cuba would not only make a bad bargain on the basis projected but would incur the hostility of foreign governments, whose representatives have already protested against the making of exclusive trade concessions to the United States.

The proposed reductions on American iron and steel and metal products as found in the treaty are significant in view of the fact that the United States now controls a very large share of this trade. Nevertheless the differential in favor of American exporters on the metal schedule is very generous. On cast iron, for example, the reduction in favor of the United States is 50 per cent. for all items, as is also the cut on wrought iron and steel in ingots. On rails the reduction is 40 per cent.; on bars, rods, &c., 30 per cent., and on fine crucible steel 25 per cent. On sheet iron or steel the differential is from 23 to 50 per cent., according to gauge and finish, the greater reduction being made on the cheaper product. The differential on other items of iron and steel is as follows: Wrought iron or steel, rough, weighing 25 kg. or more per piece, 20 per cent.; the same weighing less than 25 kg., 26 per cent.; wheels, fish plates, springs for railways, &c., weighing more than 100 kg., 16-2-3 per cent.; same weighing less than 100 kg., 21½ per cent.; iron pipe, 29 per cent.; wire, galvanized or not, 20 per cent.; anchors and anvils, 20 per cent.; wire gauze, 20 and 25 per cent.; fine tools, 25 per cent.; common tools, 33-1-3 per cent.; screw, nuts, bolts, &c., 45 per cent.; saddlery hardware, 33 per cent.; buckles, 50 per cent.; needles, 50 per cent.; crochet hooks, &c., 50 per cent.; common cutlery, 30 per cent.; fine cutlery, scissors, fish hooks, &c., 50 per cent.; surgical instruments, 50 per cent.; small arms, 33-1-3 to 40 per cent.; sporting arms, 50 per cent.; manufactures of tin plate, 25 per cent.; copper in crude forms, 33-1-3 per cent.; bar and sheet copper, 20 per cent.; copper wire, 16-2-3 to 33-1-3, according to gauge and finish; copper wire gauze, 33-1-3 per cent.; copper pipe, 20 per cent.; copper nails and tacks, 33-1-3 to 50 per cent.; nickel, no differential; tin in various forms, from 14 to 40 per cent.; zinc in various forms, from 20 to 50 per cent.

The differentials conceded to the United State on machinery of all kinds are even larger on the average than those above cited. The principal items are as follows: Weighing machines, 33-1-3 per cent.; machinery and apparatus for making sugar and brandy, 50 per cent.; agricultural machinery and apparatus, 50 per cent.; steam engines, pumps, petroleum, gas and compressed air motors, 33-1-3 per cent.; boilers, 33-1-3 per cent.; locomotives and traction engines, 33-1-3 per cent.; turn tables, hydraulic cranes and columns, 33-1-3 per cent.; dynamo-electric machines, 33-1-3 per cent.; sewing machines, bicycles and machines and apparatus not specially mentioned, 33-1-3 per cent.

It is assumed in view of the attitude of the Cuban Government and the inability of the State Department to hold out any promise of the ratification of a treaty conceding more than 20 per cent. on Cuban sugar and tobacco, that the administration will consent to amend the convention by reducing the general average of the differentials proposed for American products. The conceded purpose of the convention from the standpoint of the Secretary of State is to give the island's markets to the United States, and it is calculated that with the differentials proposed in the treaty at least 85 per cent. of the imports of the island would be drawn from the United States. It is believed, however, that should the general average of the differentials be reduced to 25 or even 20 per cent. the concession would be sufficient to secure a practical monopoly of the commerce of the island.

W. L. C.

The long contest for the control of the Columbus & Hocking Coal & Iron Company, Columbus, Ohio, has been settled. By the decision of the circuit court, the faction headed by F. M. Cronise of Lathrop & Smith and N. L. O. Kachelmacher of New York has won, and will assume control of the property. Under the terms of the decision Mr. Kachelmacher, as president, and Mr. Cronise, as vice-president and treasurer, together with the Board of Directors elected at the meeting in

Columbus last May, will be installed. This will retire from the management President Zieger and his associates, who have been holding office since May, pending a decision of the court.

### The New Chinese Tariff.

The schedules of the new Chinese tariff, which became effective October 31, as a result of the work of special commissioners of the United States and China, have been made public. The new tariff was negotiated on behalf of the United States by Thaddeus S. Sherretts, the special commissioner appointed by President Roosevelt. This tariff takes effect under a number of special regulations, which have been drawn up for its administration. Among these regulations it is stated that imports not enumerated will pay duty at the rate of 5 per cent. ad valorem, and the value upon which duty is to be calculated shall be the market value of the goods in local currency. This market value, when converted into Halkwan taels, shall be considered to be 12 per cent. higher than the amount upon which duty is to be calculated. The unit of value is the Halkwan tael, which, on October 1, was estimated by the United States mint at 63.1 cents. A picul represents 133-1-3 pounds and a catty 11-3 pounds. We present below the duties in which our readers are particularly interested.

Commodity.	Halkwan taels.
Lead:	
Red, dry or mixed with oil, per picul.....	.450
White, dry or mixed with oil, per picul.....	.450
Yellow, dry or mixed with oil, per picul.....	.450
Enameled ironware:	
Mugs, cups, basins and bowls, 9 inches or under in diameter, decorated or not decorated, per dozen.....	.050
Basins and bowls over 9 inches in diameter (agate, blue and white, gray, mottled), not decorated, per doz.	.090
Basins and bowls over 9 inches in diameter, decorated with gold, per dozen.....	.175
Basins and bowls over 9 inches in diameter, decorated without gold, per dozen.....	.125
Enamel ware, unclassified.....	.5 per cent.
Leather belting.....	.5 per cent.
Metals—Copper:	
Bars and rods, per picul.....	1.300
Bolts, nuts, rivets and washers.....	.5 per cent.
Ingots, per picul.....	1.175
Nails, per picul.....	1.300
Sheets and plates, per picul.....	1.300
Slabs, per picul.....	1.175
Tacks.....	.5 per cent.
Tubes.....	.5 per cent.
Wire, per picul.....	1.300
Quicksilver, per picul.....	4.280
Spelter, per picul.....	.375
Steel:	
Bamboo, per picul.....	.250
Bars, per picul.....	.250
Plates and sheets, per picul.....	.250
Tool and cast, per picul.....	.750
Wire and wire rope, per picul.....	.750
Oil—Castor:	
Lubricating, per picul.....	.510
Medicinal, per picul.....	1.000
Engine:	
(a) Wholly or partly of mineral origin, per American gallon.....	.015
(b) All other kinds (except castor), per American gallon.....	.025
Kerosene, per case of 10 American gallons.....	.070
In bulk, per 10 American gallons.....	.050
Oil cans and cases (kerosene), empty, per 2 cans in one case.....	.005
Tin foil.....	.5 per cent.
Tools: Axes and hatchets, per dozen.....	.500
Files, file blanks, rasps and floats of all kinds:	
Not exceeding 4 inches long, per dozen.....	.040
Exceeding 4 inches and not exceeding 9 inches long, per dozen.....	.072
Exceeding 9 inches and not exceeding 14 inches long, per dozen.....	.168
Exceeding 14 inches long, per dozen.....	.224

The free duty list includes supplies for the use of foreign forces, military and naval; supplies under Government stores certificates; materials for railways, the import of which "free" is provided for by agreements antedating the peace protocol; samples—in reasonable quantities certified for show and not for sale; circulars, &c., distributed gratis by mercantile houses; the *bona fide* baggage of travelers. Ships' coal and provisions are entitled to drawbacks.



It is understood that, in the event of there being any difference of meaning between the English and Chinese texts of the tariff and rules, the sense as expressed in the English text shall be held to be the correct sense.

Except at the requisition of the Chinese Government, or for sale to Chinese duly authorized to purchase them, import trade is prohibited in all arms, ammunition and munitions of war of every description. No permit to land them will be issued until the customs have proof that the necessary authority has been given to the importer. Infraction of this rule will be punishable by confiscation of all the goods concerned.

The new tariff, it is said, will prove very beneficial to American interests, permitting a greatly enlarged trade with China, not only in cotton goods, but many other lines as well.

### The Fritz Celebration.

On Friday, October 31, upward of 400 engineers and iron and steel manufacturers gathered at the Waldorf-Astoria Hotel to celebrate the eightieth birthday of John Fritz of Bethlehem, Pa. After a reception, in which many ladies participated, the gentlemen sat down to a banquet, the ladies occupying the boxes which overlook the main hall. The diners were seated at small tables handsomely decorated; while the guest of the evening, the president of the committee, S. T. Wellman of Cleveland, Ohio, and the speakers, occupied seats at a long table placed on a raised platform. The ends were occupied by reproductions of a blast furnace, a heating furnace and a Bessemer converter, while over draped flags on the wall back of the table shone in electric lights the words "John Fritz, 1822-1902."

Among those who participated in the banquet were the following:

Frank S. Witherbee, Witherbee, Sherman & Co., Port Henry, N. Y.  
George W. Cope, associate editor *The Iron Age*, New York.  
Hugh Kennedy, Pittsburgh, Pa.  
Lewis Nixon, president United States Shipbuilding Company, New York.  
George Mesta, president Mesta Machine Company, Pittsburgh, Pa.  
Charles H. Morgan, Morgan Construction Company, Worcester, Mass.  
Charles Raht, New York.  
David Williams, publisher *The Iron Age*, New York.  
C. M. Wales, Cleveland City Forge & Iron Company, New York.  
Samuel Thomas, Catsauqua, Pa.  
Gustav Lindenthal, Bridge Commissioner, New York.  
W. H. Derbyshire, Pittsburgh, Pa.  
George M. Bond, Pratt & Whitney Company, Hartford, Conn.  
Captain W. H. Jaques, Boston, Mass.  
W. L. Saunders, president Ingersoll-Sergeant Drill Company, New York.  
C. H. Zehnder, president Allegheny Iron & Ore Company, New York.  
H. Winfield Wyman, Wyman & Gordon, Worcester, Mass.  
George Ormrod, Donaldson Foundry, Emaus, Pa.  
Charles Wallace Hunt, C. W. Hunt, West New Brighton, New York.  
Charles Pettigrew, Maryland Steel Company, Sparrow's Point, Md.  
E. D. Meler, president Helne Safety Boiler Company, New York.  
John E. Sweet, Syracuse, N. Y.  
W. W. Scranton, Scranton, Pa.  
Dr. C. B. Dudley, chemist Pennsylvania Railroad, Altoona, Pa.  
C. C. Schneider, chief engineer American Bridge Company, New York.  
Oberlin Smith, Ferracute Machine Company, Bridgeton, N. J.  
Ed. Bailey, president Central Iron & Steel Company, Harrisburg, Pa.  
E. G. Spilsbury, New York.  
F. A. Burr, Tennessee Coal, Iron & Railroad Company, New York.  
Hon. William H. Wiley, New York.  
A. I. Findley, editor *Iron Trade Review*, Cleveland.  
H. F. De Puy, Babcock & Wilcox Company, New York.  
De Courcy May, Dickson Mfg. Company, Philadelphia.  
W. H. Bailey, New York.  
Robert Cartwright, Syracuse, N. Y.  
A. Bonzano, Philadelphia, Pa.  
C. H. Wellman, Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio.  
W. H. Fletcher, Fletcher Iron Works, Hoboken, N. J.  
F. H. Treat, Pittsburgh, Pa.  
J. E. Johnson, president Longdale Iron Company, Longdale, Va.  
Alexander C. Humphreys, president Stevens Institute of Technology, Hoboken, N. J.  
F. W. Wood, president Maryland Steel Company, Sparrow's Point, Md.  
Henry D. Hibbard, Hibbard-Rodman-Ely Safe Company, New York.

Edward Cooper, Cooper, Hewitt & Co., New York.  
T. M. Drown, president Lehigh University, Bethlehem, Pa.  
Sumner A. Ely, chief engineer American Sheet Steel Company, Pittsburgh, Pa.  
David Reeves, president Phoenix Iron Company, Phoenixville, Pa.  
Charles A. Moore, Manning, Maxwell & Moore, New York.  
Henry R. Towne, president Yale & Towne Mfg. Company, Stamford, Conn.  
William H. Morris, Morris, Wheeler & Co., Philadelphia.  
Walter Wood, R. D. Wood & Co., Philadelphia.  
Frederick A. Halsey, editor *American Machinist*, New York.  
T. N. Ely, chief of motive power, Pennsylvania Railroad, Philadelphia.  
Robert E. Jennings, vice-president Crucible Steel Company of America, New York.  
Prof. H. M. Howe, Columbia College, New York.  
John M. Hartman, Philadelphia.  
Charles R. Horn, New York.  
W. R. Warner, Warner & Swasey, Cleveland, Ohio.  
H. F. J. Porter, Bethlehem Steel Company, New York.  
E. D. Leavitt, Calumet & Hecla Mining Company, Cambridgeport, Mass.  
F. H. Daniels, chief engineer American Steel & Wire Company, Worcester, Mass.  
E. C. Felton, president Pennsylvania Steel Company, Harrisburg, Pa.  
B. F. Falkenthal, Jr., president Thomas Iron Company, Easton, Pa.  
R. C. McKinney, president Niles-Bement-Pond Company, New York.  
James Christie, Pencoyd Works, American Bridge Company, Pencoyd, Pa.  
W. H. Hulick, vice-president Warren Foundry & Machine Company, New York.  
Walter Gaston, W. J. Taylor and John M. Sherrerd, Taylor Iron & Steel Company, High Bridge, N. J.  
E. A. Uehling, Uehling-Steinbart Engineering Company, Newark, N. J.  
W. S. Pilling and H. M. Crane, Pilling & Crane, Philadelphia.  
James Gayley, first vice-president United States Steel Corporation, New York.  
G. G. McMurtry, president American Sheet Steel Company, New York.  
Julian Kennedy, Pittsburgh.  
Edward M. McIlvain, A. S. Schropp, A. E. Borie, Maunsel White and Archibald Johnston, Bethlehem Steel Company, South Bethlehem, Pa.  
Charles W. Buchholz, chief engineer Erie Railroad, New York.  
A. P. Boller, New York.  
William H. Wallace and W. Blispham of W. H. Wallace & Co., New York.  
Russell W. Davenport, Bethlehem, Pa.  
Admiral James Entwistle, U. S. N., retired.  
Benjamin Atha, Atha & Illingworth, Newark, N. J.  
S. W. Baldwin, Pennsylvania Steel Company, New York.  
Frank A. Lapham, Lackawanna Steel Company, New York.  
Charles F. Brooker, president Coe Brass Mfg. Company, Torrington, Conn.  
W. B. Cogswell and J. Waldo Smith, Solvay Process Company, Syracuse, N. Y.  
William Garrett and Horace W. Lash, Garrett-Cromwell Engineering Company, Cleveland, Ohio.  
B. J. Arnold, Arnold Electrical Engineering Company, Chicago.  
W. I. Babcock, Munoz Boiler Company, New York.  
Robert Forsyth, consulting engineer, Chicago.  
Graham Fraser, Nova Scotia.  
Joseph L. Gabelle, Gabelle Pattern Works, Cleveland, Ohio.  
T. R. Morgan, Wellman-Seaver Engineering Company, Cleveland, Ohio.  
Alfred Noble, consulting engineer, New York.  
Charles F. Porter, retired engine builder, Montclair, N. J.  
John Platt, consulting engineer, New York.  
William Sellers, William Sellers & Co., Incorporated, Philadelphia.  
Joseph E. Schwab, American Steel Foundries Company, New York.  
W. W. Snow, International Steam Pump Company, Buffalo, N. Y.  
John W. Townsend, Cambria Steel Company, Philadelphia.  
Stevenson Taylor, W. A. Fletcher Company, Hoboken, N. J.  
John Brisben Walker, *The Cosmopolitan*, New York.  
Hosea Webster, Babcock & Wilcox Company, New York.

The menu, which was designed by T. C. Martin, chairman of the dinner committee, presented a portrait of Mr. Fritz, bearing his autograph, and was inclosed in a cover simulating a tin plate, with an embossed appropriate design.

The proceedings were opened by the toastmaster, Col. Henry Goslee Prout, who said:

"We are met here for two principal purposes: first, to celebrate the eightieth birthday of our friend, John Fritz; and, second, to celebrate the successful founding of the John Fritz medal. It is little that we can add to the estimation in which he is held by those who have known him long and well. It is little that we can add to the glory of his name throughout the civilized world. It is little that we can add to the endurance of that monument which he has built for himself; but we can

find pleasure for ourselves in expressing to him, here in this public way, our admiration and our affection. We can find inspiration and a glow of enthusiasm for our lives in listening to the words of those who know his worth and his character and are qualified to appreciate them. These, I take it, are the real reasons why we are here.

"The General Committee has directed me to say to you a few words about the John Fritz medal. Its origin, its purpose and its present state. The story is short. Last spring a few friends of John Fritz met to organize a celebration of his eightieth birthday, and then the further thought came that they would establish a memorial in order that future generations might know that the men who had lived in the time of John Fritz had had the sense to appreciate his worth.

"It was natural that that memorial should take the form of a medal, and then the committee decided that this medal should be given to any one in the world who might prove his title to it by achievements in research or in applied science, and then it was decided that this medal should be given by a committee of 16, chosen from the four great national engineering societies of our country. The General Committee believes that this medal, considering its scope, considering the method of award, will be even a more distinguished honor than the Bessemer medal, which Mr. Fritz himself is proud to hold.

"It was decided that the fund for that medal should be raised by subscription, and that each individual subscription should be strictly limited to a small amount, in order that many men might share in the honor of contributing to the fund. The committee believes that the John Fritz medal thus established will be like the olive wreath of the Olympian games, in itself a little thing, of trifling cost, but representing such distinguished achievement that it will always be among the most precious trophies of the man or the woman who is successful in getting it.

"The medal is now secure. The fund is established; the design has been made; the die has been made, and the album containing the signatures of the subscribers to the fund will be presented now to Mr. Fritz, as will the master cast, from the reduced mold, by John Thomson, to whom, more than to any other one man, we are indebted for the idea of this medal. John Thomson."

#### **The Medal Presented.**

"We have thought, Mr. Fritz, it would please you to have a permanent record in respect to the founding of the medal which is to bear your name. I have here an album, entitled 'The John Fritz Medal.' It is dedicated to John Fritz, engineer, and one of the principal founders of the American iron and steel industry. It contains a photograph of yourself and also photographs of the obverse and reverse of the medal, under which is engrossed: 'To Perpetuate the Name of John Fritz and His Achievements in Industrial Progress.' The dedication is: 'To John Fritz, Engineer, One of the Principal Founders of America's Iron and Steel Industry.' In addition to the historical data and the rules for the award of the medal it also contains the names and addresses of the founders and their autographs, 484 in all, of world wide distribution.

"In behalf of the founders of the John Fritz medal I have the great pleasure to present you with this album, asking that you accept it and that for which it stands as testifying our admiration and regard, and we would have you believe that we desire no higher honor than to be known as friends of John Fritz of Bethlehem.

"We have also thought that it would add to your pleasure to announce, especially upon this occasion, the name of the recipient of the first medal. The rules adopted relative thereto seem to indicate at this time but one name, in that the stipulation is expressly set forth that the award shall be made to commemorate the most notable scientific and industrial achievements.

"These plaster plaques were reproduced from the original clay models created by the artist, and from these were cast a duplicate set in bronze. But no other duplicates will ever be molded therefrom, for I shall now destroy the master patterns.

"I am duly authorized and directed by the founders of the John Fritz Medal to make the following official announcement of the award: We ask that you, John Fritz, accept these bronze plaques, the first John Fritz Medal, the only one of its kind which will ever be presented, as an award made by and coming directly from the founders, our unanimous finding being that, of all the captains of industry, this medal may most worthily be bestowed upon you."

The breaking of the master patterns was a dramatic moment and great cheering accompanied the presentation of the medal.

#### **Mr. Fritz Responds.**

In reply Mr. Fritz said:

"I do not know what to say in response to this reception that I have been given here to-night. It is utterly beyond my power to express the feelings that are in my mind. The only thing that I can do is to accept this in the name of the four great engineering societies. I am carried back to the days of my youth when as a farmer's boy even my wildest dreams could not have conceived of this great honor. I thank you from the bottom of my heart. But I am the recipient of an honor beyond my deserts."

Cries of "No! no! no!" were most emphatically repeated.

"I think," Mr. Fritz continued, "of the laboring men who have stood by me and who will ever be held in high regard in my memory. I regret my insufficient education in the inefficient facilities of my native place, but I am glad that my worthy father inculcated in me economy and faithfulness and the religious training that taught me to revere a Supreme Being.

"There are times when it is agreeable to be under obligations to friends whom one esteems. I give you all my hearty good wishes."

Abram S. Hewitt was expected to speak to the toast "The Fathers of the Art," but was unfortunately prevented by illness. He however sent the following letter addressed to E. G. Spilsbury, the sentiments expressed receiving tumultuous applause:

#### **Abram S. Hewitt's Address.**

"My Dear Sir: As you are aware, I have been debarred for some time by the limitations of age from assisting at any function which takes place in the evening. I have been trying, however, to make an exception in favor of the complimentary dinner given by his admirers to my old and valued friend, John Fritz; but now that the time has arrived I find I must deny myself the pleasure of personally congratulating him in the company of his loving friends upon the attainment of his eightieth birthday in the full possession of his health and faculties, and with the promise of many honorable years to come.

"We have made the journey of life together and to some extent upon the same lines of action. It is pleasant to recall that during the half century of our association, at times of competitive struggle, the friendship which has existed between us has never in the slightest degree been disturbed. This happy experience is due, doubtless to the amiable traits of Mr. Fritz's nature, which, with all its masculine energy, is tempered with the sweetness of the gentler sex. 'Once a friend, always a friend,' will be inscribed upon the record of a career which in some respects is unique among the men of our day and generation.

"I do not intend to indulge myself in recounting any of the interesting details of his long and useful life. This pleasant duty will be performed by others, but I do desire to point out that the life work of John Fritz affords a very conspicuous example of the working of American institutions during the century which has just closed, the most remarkable era of progress in the history of the human race.

"That a boy born in humble life, with no advantages of education or opportunities for position, without influential friends or the favoring accidents of fortune, should be able to advance steadily in usefulness, power and the respect of his fellow men until by common consent he occupies the first place in the domain of practical industry with which he has been connected, gives



conclusive evidence that political institutions which afford free play to individual ambition, industry, ability and strict integrity are worthy of all loyalty and should be cherished and preserved at all costs and hazards.

"The developments of the twentieth century show that these institutions are in great peril. Their essence is to be found in individual liberty, involving the right of free labor and the acquisition of private property under lawful conditions. When the right of free action shall be suppressed the possibility of a career like that of John Fritz will be destroyed. Collectivism, ending in Socialism, may afford other advantages, but let it not be overlooked that these advantages will be obtained only by the sacrifice of personal freedom, and will arrest the progress of civilization due during the ages that have passed to the substitution of freedom for force.

"John Fritz is a living proof of the results of individual and industrial liberty in a country endowed with boundless resources. In vain shall we seek for a like career in nations or in countries where the individual initiative has been suppressed. The stagnation of China, whose men are physically strong and whose resources are abundant, is in marked contrast with our own land, where heretofore every citizen has been free to employ his labor and his energies in his own way so long as the rights of others were respected.

"John Fritz, therefore, is to us more than a man whom we owe love and respect, more than a friend to whom we wish many years of health and happiness; he is an example of the free spirit of American institutions, a beacon light warning the present and coming generations against permitting any invasion of the principle of the liberty of the citizen which alone has made our beloved country great and free."

Rear-Admiral George W. Melville responded eloquently for the Navy, and then there was introduced Charles H. Haswell, as the oldest living marine engineer in the world. Mr. Haswell, who is 93 years of age, responded briefly and was followed by Brig. Gen. Eugene Griffin, who spoke to the toast, "The Army."

The announcement was then made that Governor Francis, president of the St. Louis-Louisiana Purchase Exposition, had appointed John Fritz as Honorary Expert of the Department of Metallurgy of Iron and Steel.

Messages were then read from Andrew Carnegie, from E. Windsor Richards, E. P. Martin and Arthur Keen, from C. M. Schwab, the Verein Deutscher Eisenhuettenleute, P. T. Berg of Stockholm, Axel Sahlin of Millom, England, Adolphe Greiner of the Cockerill Works, Seraing, Belgium; Max Meyer, Differdingen; Joseph Wharton, Philadelphia; George Westinghouse, Pittsburgh; Irving T. Scott of San Francisco; Ambrose Swasey, Japan, and others.

George Shattuck Morison, a past president, responded for the oldest of the engineering societies, the American Society of Civil Engineers. He was followed by Dr. R. W. Raymond, the secretary of the American Institute of Mining Engineers, who, in part, spoke as follows:

**Dr. R. W. Raymond.**

"The American Institute of Mining Engineers belongs to the class of which John Fritz is an example and a type. There are three kinds of people: the men who do things; the men that hinder things, and the men that report and criticise things—the doers or workers, the shirkers and the reporters. Now the American Institute of Mining Engineers is composed of the men who do things. The first president of the American Institute of Mining Engineers, David Thomas, and its twelfth president, John Fritz, alike, were practical men; men who had made their own way, and who, although they had been obliged to triumph without the aid of an early education, were among the most cordial to welcome such an education, its advantages to the next generation and its aid to themselves.

"We have in our membership common miners, laborers, mine foremen, people that can't spell. We have men who understand, and we have had from the beginning, and it has been our strength and glory and our growth that we had from the beginning, men who understood not merely the intricacies of theory, but the still more devilish intricacies of actual experience.

"Here is another particular in which I claim that John Fritz is a worthy member and a typical member of the American Institute of Mining Engineers. In the 31 volumes of our Transactions—over 25,000 pages octavo—you will not find in the Transactions of these real national men workers, you will not find one single line about raising the pay of engineers. You will find a great many pages about raising engineers. You will not find one single plan for shortening the day's work or diminishing the quantity of labor that an honest man gives for his wages.

"But you will find a great many pages devoted to the problem of increasing and improving the quality of the labor. You will find the spirit of giving more than you get stamped on those pages. You will find that the enemy of that society is not capital, but ignorance; that the weapon of that society is not a brutal boycott or the sympathy strike, or the voluntary idleness which a certain friend has recently declared to be the weapon of another society, but industry and knowledge and light. You will find that society recognizing individual manhood. You will find that society rewarding it with its recognition and its praise, and not believing in any solidarity of occupation which constitutes a mass without units.

"You will find that society entertaining the ideal of manhood that rises not upon the ruined homes and slain bodies of its fellow men, but uplifted on their grateful hands. You will find that society standing in a solid rank for individual liberty, for individual endeavor, for the man who works over hours, for the man who thinks more of his duties than of his rights, for the man who gives forever and forever more than he gets. And against the glorified picture of another John which has been set before us in these later days we elevate the type of our John—John Fritz. And we match John Fritz's day with John Mitchell's day. That was yesterday. This is to-day, and, thank God, it is to-morrow and forever. I pray God that the medal which we have this night installed stand forever, to those who shall win and wear it, as the name upon it stands to-day, for such qualities as these."

**The Testimonial from the Pacific Coast.**

John C. Kafer then arose to present to Mr. Fritz on behalf of Irving M. Scott of San Francisco a very handsome loving cup, which bears the words: "To John Fritz on his eightieth birthday. The Builder of the West greets the Genius of the East. The 'Oregon's' performance glorifies the steel of Fritz." The cup, a tall, slender vessel, has engraved upon it the outlines of the American continents, and the course of the "Oregon," showing the harbors touched during the famous passage of the battle ship from the Pacific to the Atlantic coasts, the distances being given.

Mr. Prout then introduced as one of the Bessemer boys

**Capt. Robert W. Hunt,**

who responded to the toast of the American Society of Mechanical Engineers, and said:

"It happened to be my fate to commence my active career in the iron and steel business at Cambria in 1860, and I went there just one month after John Fritz had resigned his position as chief engineer and general manager of that concern to remove to Bethlehem to establish the Bethlehem Iron Company. When I went to Cambria I found I entered a house of mourning and I was greeted with tales of the attributes and the loving kindness and all else that go to make a man, of the old man who had gone away. I found there succeeding him his brother, George Fritz, and it was my fortune to become—to the end of his too quickly ended life—his most intimate friend. But it was in 1873, and it was through him, and by him, that I knew and became known by John Fritz. You call him *Uncle John*. I have a right and I claim a closer tie because he has honored me, and it has been my fortune during years, many active years, to know that I was one of his boys.

"I regard George Fritz to-day as the greatest mechanic that I ever knew, and still he thought, as he called him with the rest, the Old Man was greater than he. But I know that neither one of them ever took a

step that they did not consult one with the other and each attributing to the other the greatest respect for their ability. And later Alexander Holley was let into the family. John Fritz, George Fritz, Alexander Holley. Think of that combination, gentlemen. They were the pioneers of the Bessemer business in America, and with such leaders able assistants had to come. The result: America has led the world.

"And back of Mr. Fritz, which you all know, is that he has liked hard work and he always has built better than he really knew. I remember on one occasion he called in a friend to criticize a piece of machinery which he had designed, and steam had been turned on and it was running. The only comment that this friend made was: 'Mr. Fritz, don't you think that you have made it unnecessarily strong?' John replied: 'Well, if I have, it will never be found out.'

"When John W. Gates precipitated the discussion upon the American Congress and the affairs of our nation as to whether or not we were paying too much money for the armor for our ships, the authorities turned to Mr. Fritz to give them the figures of the proper cost of production, to give them the design of a plant and the cost of that plant. The then Secretary of the Navy in introducing him to that Congressional Committee said: 'Gentlemen, I present to you John Fritz, the most honest man I have ever known.' And the result was that Mr. Fritz's figures and the confidence in them saved our nation from making the great mistake of entering into that manufacture."

An admirable and scholarly address was delivered by Prof. Elihu Thomson of Swampscott, Mass., in behalf of the fourth national society, the American Institute of Electrical Engineers.

#### Oliver Williams

of Catasauqua, Pa., was called upon to respond to the toast, "The Valley and the Neighbors," saying:

"Seventy-five years ago The Valley was practically an unknown district. At the upper end one or two cranks were endeavoring to persuade their neighbors that the black stones that were outcropping all around could be burned, but with very little success. Thirty years afterward, by the course of evolution, these black stones became black diamonds. The cranks became coal operators. Twenty years later, through the same evolution, the operators became coal barons.

"I will not stop at this late hour to give you a history of the wonderful development of the iron industry in the Lehigh Valley. From the date that Father Thomas blew in the first anthracite furnace in 1839 up to the present time the furnaces have poured out their iron by the millions of tons.

"It was about 40 years ago that John Fritz invaded that Valley. He came from the rural districts and took possession of our land. It was a scene of bucolic innocence when he came there. I do not think that I am prejudiced, but with diffident earnestness I want to tell you that the people of that district, The Valley, were distinguished for amiability, their beauty of person, their courteousness, their dignity, their earnestness, their firmness and their generosity. I do not mean to say that all of the people have all of these points combined in them. There are only two that really had all these points combined in them. I would say that one is John Fritz.

"It was my fortune ten years ago, on an occasion of this kind, to be one of a number who thought it would be just as well to test this question whether John Fritz was really so great an engineer as people thought he was, and to test the question we had a court and jury impaneled. I am frank to say we could not find a jury of his peers to try him, but we did get 12 college presidents as the jury, and they served on that occasion, and the result was that the jury wanted to condemn the prosecuting attorneys.

"It is with the deepest feeling that I speak to you to-night for a moment of the love and esteem in which we hold this man in The Valley. We know all about him, gentlemen. We can say that we have eaten with him and we have drunk with him and we have slept with him and we have gone to Pittsburgh with him.

"In the palmy days of Venice they had a book that was called the 'Book of Golden Deeds,' and in that book were written the great deeds of those men that had acted worthily toward the great republic. The Golden Book of the Lehigh Valley is in the hearts of the neighbors of this man, and first and foremost in their hearts is written the name of John Fritz."

The last speech of the evening, an eloquent one, full of telling points, was that of Daniel A. Tompkins on "John Fritz's Old Boys." Mr. Tompkins is now associated with Southern interests as an engineer and a business man. He paid an eloquent tribute to Mrs. Fritz, who, surrounded by friends, sat in the center box facing the speakers' table.

#### A Most Remarkable Blast.

Engineers and others who have to do with the use of explosives in blasting will be much interested in an accident that occurred at Niagara Falls a few days ago, for it seems beyond comprehension that such an accident could occur. The Ontario Power Company are excavating a power house site at the water's edge on the Canadian side, not very far below the Horseshoe Fall. The site is immediately opposite Goat Island, of the New York State reservation. The river at this point is the widest below the falls. Heavy blasts were used in order that the excavated material might be thrown into the river and thus do away with handling it. The debris slope, as well as a portion of the solid base of the cliff, was being broken away, and as the river is very wide, fully 2500 feet, and the New York cliff was expected to act as a stop for any stones that might be carried across the river, no effort was made to hold the blasts down. The work was in direct charge of the Ontario Power Company.

At noon on Tuesday, October 28, a blast of unusual size was to be discharged, and word was sent to the New York State reservation officials to keep people away from the Goat Island bluff immediately following the noon hour. Such warning was given. At 12:15 o'clock the blast was discharged. It hurled a wonderful mass of rock and dirt into the air, and so terrific was the force of the blast that a tremendous shower of rock fell upon Goat Island, having been carried all the way across the river and 200 feet up in the air to the island surface. One 200-pound slab, 32 inches long, nearly 9 inches thick and about 14 inches wide, ascended very high in the air and whirled round and round like a wheel as it flew across the river, up over Goat Island to a point fully 500 feet back in the forest growth. In descending it cut a big limb off of a tree and plunged downward, striking two State reservation employees, who were walking side by side along an island path. Both died from their injuries.

At the coroner's inquest it developed that the blast contained 2500 pounds of powder and between 200 and 300 pounds of dynamite. Both black and granulated powder were used. The general direction of the blast was at right angles with the water. In one drift and shaft combination were placed 60 kegs of powder and 100 pounds of dynamite. In a small shaft tunnel 37 kegs of powder and 50 pounds of dynamite were placed. Beside this there were two large boulders, a box and a half of dynamite and three kegs of powder. In addition to this there were drill holes. All the charges were tamped. Damage suits will follow. The case may develop international importance. In his verdict Coroner Slocum charges the Ontario Power Company with negligence.

On Friday last the Niagara Falls Power Company commenced furnishing power from the first generator erected in power house No. 2. This unit is of 5000 horsepower, and the current is being furnished to the Union Carbide Company. By the first of the year it is expected that two or three additional generators will be in service in the new station. It will be recalled that the complete installation in the station will furnish 55,000 horse-power, making the entire power product of the Niagara Falls Power Company 105,000 horse-power.



## Naval Ordnance.

### The Report of Admiral Charles O'Neil.

WASHINGTON, D. C., November 4.—The forthcoming annual report of Admiral Charles O'Neil, chief of the Naval Bureau of Ordnance, will embrace an interesting discussion of problems now engaging the attention of the leading maritime nations of the world, including the latest developments in the endless contest between the gun and the armor plate, the relative importance of armor and armament as compared with speed, the value of the submarine torpedo boat, and the Governmental manufacture of smokeless powder. Admiral O'Neil also embodies in his report a strong defense of the armor plate manufacturers who have been charged with responsibility for the delays experienced by the Department in the construction of the warships recently completed and now under way.

#### Armor.

No improvement worth speaking of, says Admiral O'Neil, seems to have been made in the quality of armor of late, which is to be regretted, as gun powders and projectiles have each made a decided advance, rendering it all the more necessary that there should be an improvement in the quality of armor; but none seems to be in sight at present.

The manufacture of armor has progressed in a satisfactory manner, 7612 tons having been delivered at the various shipyards during the past year, and it is probable that this amount will be considerably exceeded during the next 12 months. At the request of the Bureau the armor manufacturers consented to increase their facilities to the extent necessary to meet the requirements of the Department. Efforts were made by the Bureau to standardize the drawings for 8 and 12 inch turrets, in order that the armor manufacturers might have abundant work while waiting for detailed drawings of the side and other armor, in the absence of which work cannot be proceeded with. Much to the Bureau's regret, it was unable to carry out this scheme for want of co-operation on the part of all parties concerned, except the armor manufacturers, who favored the plan suggested. Recently the armor manufacturers voluntarily made a reduction of 10 shillings per ton on the royalty for the Krupp process.

#### Delays Not Due to Armor.

The impression prevails generally, says the report, that the cause of delay in the completion of armored vessels is due to the nondelivery of armor, but while there have been a few occasions of this kind in the past, the general impression is erroneous. Delays in the first instance were due to the fact that the manufacture of armor in the United States was a new industry, and the development of armor took place so rapidly that in order to keep pace with and supply the best quality, it became necessary to direct certain changes in the process of manufacture, such, for example, as the introduction of the processes of facehardening, reforcing and the use of nickel, which entailed considerable delay in delivery. In later years the development of the Krupp process, and the time consumed by Congress in settling the question of the cost of improved armor, also led to delays beyond the control of the Bureau.

The hulls and machinery of battle ships "Kearsage" and "Kentucky" were contracted for in January, 1896, and their armor was contracted for in June, 1896; that is, six months later. These vessels were completed in February and May, 1900, but the last armor plate for the "Kearsage" was delivered at the shipyard May 20, 1899, but was not placed on the ship until October 23, 1899; that is, five months after its receipt and four months before the final completion of the vessel. The last plate for the "Kentucky" was delivered June 10, 1899, but was not placed on the vessel until January 4, 1900, nearly seven months after its receipt and four months before the final completion of the vessel. Hence it will be observed that it was not lack of armor the delayed these vessels.

The hulls and machinery of battle ships "Alabama," "Illinois" and "Wisconsin" were contracted for in September, 1896, but their armor was not contracted for until June, 1898, that is, 20 months later, this delay being due to the action of Congress with regard to the cost of armor. The "Alabama" was completed in October, 1900, her last armor plate having been delivered June 4, 1900, and being placed on the vessel August 17, 1900. The "Illinois" was completed in September, 1901, her last armor plate having been delivered August 31, 1900; that is, a year before the final completion of the vessel, and it was placed on the vessel October 31, 1900, ten months before the vessel was in all respects completed. The "Wisconsin" was completed in February, 1901, her last armor plate having been delivered June 30, 1900, eight months before the completion of the vessel in other respects. Hence it will be seen that the final completion of these ships was not delayed on account of the nondelivery of armor, though it is claimed that in the case of the "Alabama" her final completion was delayed on that account.

With regard to the harbor defense monitor, the "Arkansas," is just completed, but her last armor plate was delivered June 28, 1901, 15 months ago. The "Florida" is reported as 94 per cent. completed. Her last armor plate was delivered November 30, 1901, ten months ago. The "Nevada" is reported as 98 per cent. completed. Her last armor plate was delivered May 23, 1901, 16 months ago. The "Wyoming" is reported as 95 per cent. completed. Her last armor plate was delivered March 2, 1901, 18 months ago. Hence, it will be seen that these vessels were not delayed for want of armor.

The contracts for the hulls and machinery of battle ships "Maine," "Missouri" and "Ohio" were made in October, 1898, and the contracts for their armor in November, 1900, about 25 months later; this long delay being due to the attitude of Congress concerning the armor question. Notwithstanding this long delay the last armor plate for the "Maine" was delivered at the shipyard early in June last, and the vessel is not yet completed in other respects, showing that her final completion is not delayed on account of the nonreceipt of armor. All the armor for the "Missouri" and "Ohio" has been delivered with the exception of the shutter plates, and yet these vessels are but 74 and 64 per cent. completed respectively, showing that they are not delayed for lack of armor. The hulls and machinery of battle ships of the "Virginia" class, six armored cruisers of the "Pennsylvania" class and three protected cruisers of the "St. Louis" class were contracted for in January, February and March, 1901; their armor was contracted for in November, 1900, two or four months prior to the dates of the hull and machinery contracts, and deliveries of armor under the armor contracts have exceeded the contract requirements, and the manufacturers have increased their plants to insure a still greater output.

Considerably more armor could have been delivered under these contracts had it been possible to get the armor drawings from the shipbuilders, to whom frequent application has been made therefor. The last vessels above referred to were contracted for 18 or 20 months ago, and in some instances armor drawings have not yet been received, or only those for a trifling amount, and it if should turn out that delay in the completion of the vessels is finally due to nondelivery of armor these contractors will be responsible therefor rather than the Bureau or the manufacturers.

From the foregoing it will be seen that notwithstanding the many embarrassments and vexatious delays with which the Bureau has had to contend, due to causes beyond its control, the armor situation is by no means as discouraging as is by many supposed, and now that large contracts are outstanding and the manufacture is running smoothly, there is little to be apprehended, except that the present delay in receiving drawings will result in a large number coming in all together at a later period, when it may be difficult if not impracticable to meet the requirements of the shipbuilders. All the armor required for ships authorized,

except about 11,500 tons for those authorized at the last session of Congress, has been contracted for, and contracts will soon be made for the balance.

#### Speed vs. Armor and Armament.

The relative importance of speed, armor and armament in vessels of the more important types is a question concerning which the best authorities differ to a greater or less extent, for while it is generally conceded that the so-called armored cruiser should be more speedy than the battle ship, opinions are at variance as to the relation of speed to the other elements in the respective types of vessels. It may be conceded, however, that in both types the highest attainable speed is desirable, provided it be not obtained at too great a sacrifice of other important qualities. All nations are afflicted with the speed craze at intervals, and this country is no exception, and unless each batch of new vessels can equal or beat the world's record they are usually characterized as failures, and in deference to public sentiment the tendency is to design vessels of the highest possible speed, irrespective of the uses for which they are intended, and in consequence enormous sums of money have been expended by several countries in producing large and fast vessels which have but trifling value for fighting purposes, and to-day it requires no little moral courage on the part of designers to subordinate the popular element of speed to other qualities, no matter how important the latter may be.

At the present time our latest designs of battle ships and armored cruisers call for vessels of 18 and 22 knots speed on trial respectively, whereas the latest foreign vessels of corresponding class are designed for 19 and 23 knots speed respectively, and it will not be out of place, therefore, to explain briefly the cause of this seeming deficiency in our latest vessels.

It has always been the policy of the United States to provide its vessels of all classes with great battery power—that is, to so arm them that they shall be superior to foreign vessels of equal class in that respect, and that sentiment still prevails; and while we have in a few instances subordinated all other elements to speed, it is not likely to occur again and the consensus of opinion at the present time is in favor of applying large percentages of weight for armor and armament rather than to assigning it for the purpose of attaining the last possible fraction of a knot of speed.

In the case of the new battle ships of the "Louisiana" class, of 16,000 tons trial displacement, 945 tons are given to armament and 394 tons to the two-thirds of the ammunition supply carried on trial—that is, 1339 tons, equal to 8.36 per cent. of the trial displacement, are assigned for ordnance purposes, and 3927 tons are assigned to protection, which includes all the armor proper, 155 tons of bolts and nuts and 23 tons of cellulose, but does not include the protective deck and splinter bulwarks, which are included in the weight of the hull. The above protection is equal to 24.5 per cent. of the trial displacement; consequently in these vessels 5266 tons, equal to 32.86 per cent. of the trial displacement, are allowed for the armor, armament and two-thirds of the ammunition, the vessels carrying all the other usual weights and 900 tons of coal on trial. To have increased the speed of these vessels 1 knot—that is, to 19 knots—would have necessitated an increase of about 2800 indicated horsepower, with an approximate increase of weight of machinery of 255 tons, which would have to be taken from armament or armor, or both, as it could not well be taken from any other objects. This weight is greater than that of eight 8-inch guns and mounts, which weight is 235.5 tons, and is equal to the weight of ten 7-inch guns and mounts; hence it will be observed how great a sacrifice of armament would be necessary if the weight of the extra horse-power was obtained from that source. If it was taken from armor it would reduce it to the extent of 6½ per cent., or more than the weight of two 12-inch turrets, which weigh 236 tons.

This extra knot of speed, while perhaps very desirable, as it is represented by engine and boiler power, would never be realized except on the vessels' speed trials, and in any event would disappear a few months

after the ships were docked, cleaned and painted; whereas their guns and armor will remain as long as the vessels endure; consequently it has been deemed preferable to have them 18-knot vessels with greater powers of offense and defense, rather than 19-knot ships with a sacrifice of both.

With regard to the new armored cruisers of the "Tennessee" class, of 14,500 tons trial displacement, a speed of 22 knots has been deemed sufficient, as the weight of machinery necessary to drive them another knot would exceed that of four 10-inch guns, mounts and turrets, which weigh 379 tons, and even an extra ¼ knot would represent the weight of over 2 inches on the protective deck.

These vessels are intended for fighting and not for scouting, and therefore it is necessary that they should carry every ton of armor and armament compatible with reasonably high speed and good coal supply. They may not improperly be termed fast battle ships, for what they lack in armor and armament they make up in speed. The great increase in the number and power of guns of the intermediate and secondary classes carried by the latest foreign vessels renders it extremely important that all ships intended for or liable to be placed in the battle line should have as much armor protection as possible.

In the armored cruisers of the "Pennsylvania" class of 13,680 tons trial displacement 5.19 per cent. of the displacement is allowed for the armament and two-thirds of the ammunition, and 14.78 per cent. is allowed for armor, bolts and backing, a total for armor and armament of 19.97 per cent. of the trial displacement; whereas in the armored cruisers of the "Tennessee" class of 14,500 tons trial displacement 6.18 per cent. of the displacement is allowed for the armament and two-thirds of the ammunition, and 16.19 per cent. is allowed for armor, bolts and backing, a total for armor and armament of 22.37 per cent. of the trial displacement. Hence the "Tennessee" is allowed ninety-nine one hundredths of 1 per cent. more weight for armament than is the "Pennsylvania" and 1.41 per cent. more weight for armor, or 2.40 per cent. more for both.

No country can afford to build scouting vessels costing \$7,000,000 each, which is approximately the cost of the cruisers of the "Tennessee" class, nor is it necessary that such large and heavily armed vessels be used for such purpose. The Bureau is convinced that no mistake has been made in the adjustment of the speed, armor and armament of these vessels. The best vessel is not necessarily the one that can most quickly get in or out of battle, or keep out of battle, but is rather the one that can remain in battle the longest after she gets there. It is safe to say that any vessels of this class, of equal displacement, having a higher speed, are deficient in some of the other important qualities which these vessels possess.

#### Gun Development.

The remarkable increase which has been made of late years in the energy of guns, due to changes in their dimensions and to the introduction of improved agents for propellants, can best be illustrated by two examples. A few years ago the 6-inch gun was 30 calibers in length and weighed 4.8 tons; its muzzle velocity was 2000 foot-seconds (using brown powder and a 100-pound projectile), its corresponding muzzle energy was 2773 foot tons, and its practicable rate of fire was 2½ aimed shots a minute; its muzzle energy per minute was therefore 6932 foot tons. The latest type of 6-inch gun is 50 calibers in length and weighs 3.2 tons; its muzzle velocity (using smokeless powder and a 100-pound projectile) is 5836 foot tons; its practicable rate of fire is eight aimed shots a minute, and its muzzle energy per minute, therefore, is 46,688 foot tons, or more than 600 per cent. greater than that of the 30 caliber guns using brown powder. The muzzle energy of one round of the present gun, using smokeless powder, is 3,063 foot tons greater than that of the old gun using brown powder, an increase of 109 per cent. It is not claimed that 8 aimed shots per minute can be fired from the 6-inch gun except for brief periods, but such a rate has been attained and eight hits have been made in one minute at record



practice on foreign vessels, and it is hoped that the time is not far distant when it will be done by our own.

The earlier 12-inch guns were 35 calibers in length and weighed 45.2 tons. They had a muzzle velocity of 2100 foot seconds (using brown powder and an 850-pound projectile), with a corresponding muzzle energy of 25,985 foot tons. The latest type of 12-inch guns are 40 calibers in length and weigh 52 tons. Their muzzle velocity is 2800 foot seconds (using smokeless powder and an 850-pound projectile), and their corresponding muzzle energy is 46,246 foot tons, an increase of muzzle energy over that of the earlier guns of 10,261 foot tons, equal to 35½ per cent. It is not likely that any such advance will be made in the near future.

#### Submarine Boats.

No important developments, says Admiral O'Neill, have taken place in this country during the past year with respect to submarine boats, and none, so far as can be learned, of any consequence abroad, though quite a number of these vessels are being built and experimented with. The seven boats of the Holland type now under contract have not been completed, though they are in an advanced stage, and will soon have their official trial for acceptance. The original "Holland" has been stationed at Newport and at Annapolis for the purpose of training men for the new boats. The explosions which have occurred on board the Holland and Fulton are described at some length and are attributed to gases generated by the storage batteries which were ignited by sparks from electrical apparatus. These accidents demonstrate the importance of the best possible ventilation of these craft under service conditions. Admiral O'Neill expresses the opinion that several of the submarine boats should be hauled out of the water and stored, but that at least two should be kept in commission during the coming winter in order to test them in very cold weather as well as to train officers and men for service in these vessels. An increase of pay is asked for enlisted men detailed to submarine boats.

#### Smokeless Powder.

The manufacture of smokeless powder during the past year has progressed in a satisfactory manner so far as quality is concerned, but not so much as to the amount delivered, as a large quantity has been required both for new and old ships, not only in the way of original outfits, but to make good the annual consumption due to target practice, which amounts in the aggregate to a very large quantity. Efforts have however been made to secure more rapid delivery, and it is expected that the bureau's requirements in this respect will be more satisfactorily met hereafter. The reports of inspections and tests of smokeless powder during the year from ships and from powder magazines have been favorable, and no unstable powders have been detected.

Numerous retests of powder of earlier date of manufacture have been made for the purpose of determining whether the powder had undergone any chemical change or if its ballistic properties had changed. It may be definitely stated that, so far as stability is concerned, the results have been of a most satisfactory character, and with few exceptions the ballistic properties of the powders have practically remained unchanged. In a few instances the powder has become drier and in consequence quicker, but in one instance only did a retested sample of service powder show what might be considered an undue increase in pressure, and this was unquestionably due to the fact that after the weight of the charge had been fixed the powder dried out somewhat before it was put up for issue. All smokeless powder is now dried to a proper degree and is then immediately packed in air tight zinc lined cases, in order that it may retain practically the same amount of volatiles. It is not unlikely that by some improved process of drying practically all the volatiles can be removed from smokeless powder, and then when tested it will be in most efficient condition, and should it thereafter take up a slight percentage of moisture it would become less violent—that is, slower—but it must still be kept as dry as possible, for a too slow powder might endanger the muzzle of the gun.

#### Ordnance Progress Abroad.

Admiral O'Neill describes in some detail a visit which he made during the past summer to the principal ordnance factories in England, France and Germany, and which he said was highly instructive and deeply impressed him with the efforts being made to produce the best and most efficient ordnance and other war material that could be made, regardless of pains and expense. He was especially interested in Krupp's exhibit of armor, artillery, &c., at the Düsseldorf Exhibiton, which he says was probably one of the finest, if not the very finest, exhibits of its character that was ever made. The most striking feature, from a metallurgical point of view, was an armor plate of 106 tons in weight. This plate was 11 13-16 inches in thickness, 43 feet 2 inches in length by 11 feet 2 inches in width, and the Admiral gives it as his opinion that no other establishment in the world could produce such a plate. In view of the fact that the manufacture of armor at Essen was first undertaken by Herr Krupp in 1891, only 11 years ago, the progress made is regarded as remarkable. In commenting upon the output of this establishment Admiral O'Neill says that while there are no such factories in the United States in point of size and capacity, it is gratifying to know that such as we have do not suffer by comparison with any of those in Europe as regards the character of the work performed or the method of performing it.

W. L. C.

### Iron and Coal in Scotland.

#### Satisfaction Over the End of Our Coal Strike.

GLASGOW, October 17, 1902.—The announcement that the coal strike on your side is practically over, as both parties have agreed to submit the differences to a commission nominated by President Roosevelt, gives great satisfaction here. This may surprise those Americans who fancy that we have been rejoicing in a large flow of American orders for coal. As a matter of fact the flow has not been so large as the newspapers made out. In all Scotland the orders received from the United States for coal since the first order for a cargo of Scotch anthracite three weeks ago will not exceed 50,000 tons, and it is doubtful if all of that will be shipped, as canceling orders are now being cabled. In all the United Kingdom the quantity sold to the United States will not probably exceed 250,000 tons and may not be more than 200,000 tons. This is a small lot for all the talk made about it, but the very fact of America buying any British coal was exciting, and when the modern journalist gets excited he also gets reckless. Each order for 2000 tons became 20,000 tons before it got through the hands of the ubiquitous reporters. The spreading of these reports naturally excited coal owners and dealers and even caused the miners to begin talk about agitating for an advance in wages. Of course an attempt was made to rush up prices, and for a few days very fancy quotations were advertised. But the actual advances obtained have ranged from 1 to 2 shillings per ton and the average of the whole country may be taken at 1 shilling 6 pence per ton. This is not very much, but it is a great deal too much in a declining condition of industry, and just at a time when manufacturers were looking for some further saving in their coal bills toward reducing costs. The report that the American strike is over is therefore a relief to both the masses and the classes in this country. Even the coal owners do not regret the termination of a state of affairs which placed them in a false position, although it enabled them, or might enable them, to get better prices for awhile.

It is said that close upon 100 steamers have from first to last been chartered to take coal from England, Scotland and Wales to the United States—New York, Philadelphia and Boston I mean, not the ports on the Pacific Coast, with which there is a normal though decreasing trade. This is a large fleet, but the rates of freight on the charters are very small considering the risks, ranging from 8 shillings 6 pence to 9 shillings 6 pence per ton, but more at the lower than at the higher level. I say "considering the risks," because when these boats get out and pay dues, &c., they will have

precious little margin to stand by and goodness knows what return cargoes they are to get. They will for the time being reduce the supply of tonnage seeking employment in European waters, but they will still further break down the freight markets on your side, and those of them which are late in arriving out with coal may have other troubles to contend with. One can imagine that for the owners of a number of these boats the American rush for British coal will not turn out to have been an unmixed blessing.

Then one wonders how some of the coal said to have been shipped from England will suit your stoves and furnaces, whether indeed you can consume it at all. The small lots of Scotch anthracite sent ought to suit you all right, although in appearance and some of its qualities it may differ from Pennsylvania anthracite. There is not very much of this so-called anthracite in Scotland. It comes from the Stirlingshire coal field which produces our best steam coal. In this field are just a few places where is found a little hard coal resembling Welsh anthracite. But in this district some of the "splint" coal (used by the iron smelters) is worked as an anthracite and is practically smokeless, which Scotch coal as a rule is not.

#### **Restless Feeling Augmented by the French Strike.**

Although the quantity of coal ordered from Scotland has been not more than 50,000 tons if so much, there is no doubt the American demand has unsettled our coal market and created a restless feeling which has been further accentuated by the French strike. We shall of course benefit more by a prolongation of the trouble in France than we should have done by the prolongation of the trouble in America. But then France is one of our largest and most regular customers for coal and America is not. It is to be noted, however, that our coal market has been to a not inconsiderable extent sustained by America before she began to buy coal from us. The American demands for iron and steel during the last six months have made our iron and steel producers a good deal busier than they would otherwise have been, and have kept up the industrial consumption of coal. This is a point not to be overlooked in reviewing the situation. We shall have cheaper prices for coal when the American demand for the iron ceases. As far as the American demand for coal has affected Scotland it is thus: At the beginning of October splint, steam and ell coal were selling at 9 shillings 3 pence to 10 shillings per ton f.o.b. This week, before the report of the projected settlement on your side, they were selling at 10 shillings 6 pence to 11 shillings per ton f.o.b. This is for round coal only, small stuffs being unaffected. And to get even these advances sellers have had to make the very most of American orders. And our iron and steel makers have resented the concussion very much, more especially as it has stiffened the outward freights on iron and steel to America and has, or so they think, restricted the business in these commodities. The shipments of Scotch coal up to this date are about 750,000 tons ahead of those for the corresponding portion of 1901, but the home consumption is less. With a settlement in France we shall probably see a slump.

#### **American Demand for Iron Diminishing.**

If the American demand for British iron is not over, there is certainly less of it here. It is true that the exports of pig iron in September were large as compared with September, 1901—namely, 126,405 tons against 70,474 tons; but when compared with 112,947 tons in September, 1900, they do not appear very striking. And while America took 69,827 tons as compared with 5,408 tons in the corresponding month, the total hardly seems in consonance with all the talk there has been. Even at the September rate the United States would be drawing only about 800,000 tons per annum, but as a matter of fact the total in the nine months ending September was only 281,144 tons. Of course this is a big advance on 33,365 tons in the corresponding nine months of last year, and it accounts for the large diminution in our stocks. But notwithstanding the increase of 250,000 tons in the American demand, our exports of pig iron in the nine months have only gained 86,000 tons on last year and are still 400,000 tons behind 1900. To put it

otherwise, but for the orders from your side our exports of pig iron in the nine months would not have been as much as 500,000 tons.

Our home consumption would have been considerably less than it has been had you not been taking so much finished iron and steel. The fact is that the more one studies the trade situation the more one is compelled to think that as soon as America begins to contract there will be an industrial collapse in iron and steel, followed by coal. I have just returned from a part of England where there is a painful inability to keep the artisans in the steel trade employed. In the Northeastern counties of England the depression in shipbuilding is growing and the outlook is gloomy, so much so that the shipyard workers have quietly accepted a reduction in wages which a few months ago they would have resisted to the death. In Scotland the shipbuilders and engineers are too busy with current contracts to risk any trouble on labor questions just now, but here also the wage question will presently come to the front, because labor is the chief item of cost in ship building and ship building will not revive until costs are reduced. It is pleasant of course for Clyde workers that so much naval work is under construction here at present, but naval work only applies to two or three of our army of shipbuilders, and the amount of it does not indicate the commercial prosperity of the country.

Two things have operated since my last in restricting the flow of American orders for pig iron. These are the higher prices asked in consequence of the advance in coal and the higher freights asked on pig iron in consequence of the rush to secure steamers for coal. Some sales were made last week but not much has been done this week, although in some quarters it is believed that if the coal strike is really over there will be a fresh run from your side for pig iron to be shipped before the end of the year. We shall see, but in the meantime there is little here to come and go upon.

At present writing the visible stocks are only 33,000 tons in Glasgow, 121,600 tons in Middlesbrough and 26,600 tons in Cumberland, say 182,000 tons in all. Prices of warrants to-day are: Scotch, 57 shillings 9 pence; Cleveland, 53 shillings; Cumberland, 61 shillings 6 pence. Although the margin between Scotch and Cleveland is only 4 shillings 9 pence, iron is still coming here from Cleveland at the rate of 3000 to 4000 tons per day. The shipments of Scotch iron are about 70,000 tons ahead of last year. Middlesbrough hematite is quoted 58 shillings 6 pence and Scotch hematite 62 shillings 6 pence, both delivered to steel works. There are now 84 furnaces in blast in Scotland, being the same as at this time last year.

Another cargo of foundry iron from South Russia, about 4,000 tons, arrived here the other day and went immediately into consumption. Another cargo now about due is said to be not for consumption here but for transshipment to the United States. This seems a roundabout way of supplying you, but funny things occur in shipping in these times.

Representatives of the Scotch steel makers had a meeting recently with representatives of the English makers in order to discuss industrial matters. It was then agreed that boiler plates in England should be advanced to £7 12s. 6d. per ton, an increase of 2 shillings 6 pence per ton. No other changes were made. In Scotland steel ship plates are £8 per ton less 5 per cent; in the North of England the price is £5 15s. less 2½ per cent. Steel rails are not made here now, but in Middlesbrough are £5 10s. net and angles are £5 12s. 6d. less 2½ per cent.

The project has been again revived of altering the form of iron warrants, or of creating a new class of warrants in the matter of quantities. A committee of the Scottish Pig Iron Trade Association has been appointed to deal with the matter but the project is not popular.

B. T.

The contents of the chemical laboratory of the Rensselaer Polytechnic Institute, Troy, N. Y., were destroyed by fire on October 19, causing a serious loss, as the chemical apparatus was valuable and not easily replaced.



### The Steel Corporation's Shipbuilding Programme.

Much to the surprise of independent vessel owners of the Great Lakes—that is, of vessel owners having no control over freight to be carried—the United States Steel Corporation propose to build a large addition to their fleet of ore ships. Realizing the fact that the berths of the American Shipbuilding Company were all filled and were liable to be kept so, the Steel Corporation, acting through the Pittsburgh Steamship Company, have secured an option on all berths to be vacated during the year 1903 at Buffalo, Cleveland, Detroit, Lorain, Chicago or Superior. Boats now under contract or building will keep the berths at all these lake yards full until the early part of 1903. Just how many of the berths to be vacated can be occupied by ships of the type proposed is a question.

This option is at present merely indicative of the proposed work of the corporation, and no plans have been actually decided upon as to the class of ships or as to how many of them are to be laid down under it. The Duluth office has, however, been at work making plans of ships of various types and the probability is that the new vessels will be about 550 feet over all and will each have capacity on present draft for some 9000 gross tons of cargo. The present intention is that some 20 such ships will be built, all steamships, and it is likely that a few of them will be in commission late the coming season. They will cost not far from \$500,000 each.

Any such shipbuilding plan as this means an enormous addition to the carrying capacity of the lakes. The work this year of several ships of new structural type, such as the "James H. Hoyt," of which mention has been made in this correspondence more than once, is being watched with the deepest interest by Vice-President Wolvin and his associates in the management of the Pittsburgh Steamship Company. It is not the speed of a lake ship that makes for rapid service, but how the lake vessel saves her time in ports of loading and discharge. A sustained speed of 10 to 12 miles per hour and a quick delivery of cargo will add several round trips a year to the best that can be done by a ship of much higher speed, but slower delivery. So the work of the "Hoyt," which is fitted with additional hatches for quick loading and a more concentrated arrangement of beams throughout the hull for the successful operation of large and rapid unloading devices, is of especial moment in this connection. It is unquestionable, in view of what has been accomplished by the "Hoyt" this year, that the proposed big ships will be somewhat similarly fitted. This should give them, especially when trading to docks operated by their own owners and equipped with rapid unloading devices, a record of not less than 20 round trips a year, or for the proposed fleet of 20 ships, probably 3,500,000 tons of cargo annually.

Any such volume of tonnage would be a marked increase of lake tonnage for any year. In the last ten years the average annual increase of traffic into and out of Lake Superior, which is what these ships will have to figure on, has been nearly 2,000,000 net tons a year. For the period of life of the Lake Superior ore traffic the average annual rate of increase has been 16-23 per cent., diminishing in rate with the increase of actual volume. At the present time there are under way on the lakes enough ships building by independent owners to carry an addition in 1903 of at least 3,000,000 gross tons. This will be ample, doubtless, for the increased business of that year, unless there should be a late opening of the season or some unusual accident. With plenty of swift unloading plants at lower lake receiving docks there would be no difficulty in increasing the seasonal capacity of the present fleet by as much as the ships now building will carry.

It follows that vessel owners on the lakes, while they profess to disregard the new departure of the Steel Corporation, fear it most keenly. The Steel Corporation have built no ships since their creation, and

their constituent companies, all owned by ore mining concerns, had built none for some time prior to that time, and the idea had become prevalent that they would not increase. But increase is the most natural thing in the world. The Pittsburgh Steamship Company have now seasonal capacity for about 9,500,000 tons on 110 ships, some steam, some barges, some large, some small. The company's tonnage movement this year is about 15,000,000 tons, making them very heavy buyers of vessel room on the market. If by buying large and quickly handled ships that can carry ore at not much more than half the contract rate they can reduce their outside requirements to a reasonable volume it would appear the part of wisdom to do so. Having their own loading and receiving docks their ships can be handled quickened at both ends and much time can thus be saved.

Led by the large average profits of modern lake ships some independent vessel owners have accumulated important fleets of fine, up to date steel vessels. One owner, who has no connection with eastbound freights, expects to have nearly, if not quite, 100 of these vessels by the opening of another season. There is no doubt that such ships will always be in demand and will continue to pay a good profit on their cost, but rates may be much lower than now. It is possible that the Steel Corporation may decide to own sufficient tonnage to carry nearly all their ore.

The largest vessels on the lakes are 50 feet shorter than the new boats are planned to be. These are four, built by Mr. Wolvin when manager of the American Steamship Company, and they are now owned by the corporation. Every record of this year for tonnage on the lakes is held by these ships or by barges in the same ownership. It is very evident that the governing committee of the corporation does not share the prevailing belief that the best type of ship for lake service is not so large a vessel as these, but one of from 5000 to 5500 tons and about 400 feet long. Every one of the 35 steel steamships now under way at lake yards is of this type. Vessels of 550 feet length will not be able to move in some lake harbors. They will be restricted in the freight they can carry and to some extent to the ports they can enter, as well as to the docks at which they can be placed. But as the corporation will build them to move ore and practically nothing else, and as there are plenty of lower lake ore harbors and upper lake docks where they can be accommodated, this has not the influence it would have with outside owners.

This fall the Steel Corporation's vessels are well up with their work. Mr. Wolvin is taking no outside ships at the recent advance in rates. His season contracts for outside tonnage are expiring and he expects to move all corporation ore required to the close of the year on their own vessels. These will be kept running until their work is done, and none of them will be retired at this time, as has been reported in papers around the lakes.

D. E. W.

In the presence of Captain William H. Taylor, representing the Board of Construction of the United States Navy, and the naval *attachés* at Washington of the Russian, British, French, German, Japanese, Argentine, Italian and Chilean governments, the lake submarine torpedo boat "Protector" was successfully launched at Bridgeport, Conn., on Saturday. The "Protector" is designed for harbor defense. She is 60 feet long, of 11 feet beam and has a displacement of 65 tons submerged. She is equipped with a running gear to enable her to travel on the bottom of the sea. Her motive power is electricity when submerged and gasoline when cruising awash. A trap door in her bow will admit of a diver's leaving the boat and cutting cables or mine connections, and her builders believe that she can destroy the submarine defenses of any harbor in the world.

Clarence B. Schultz of New York, the American representative of the Goldschmidt process, has returned from a few months' stay in Germany.

# The Iron Age

New York, Thursday, November 6, 1902.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	-	EDITOR.
GEO. W. COPE,	-	-	-	-	-	-	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	-	-	-	-	-	-	HARDWARE EDITOR.
JOHN S. KING,	-	-	-	-	-	-	BUSINESS MANAGER.

### Price Reductions Extending

As expected, merchant pipe and tin plates have been added to the list of finished products on which prices have been materially reduced. Revision downward has now been made in the prices of sheets, wire products, merchant pipe and tin plates. These are important products of constituent companies of the United States Steel Corporation, and the official announcement of the price reductions made by those companies is worthy of special consideration for several reasons. In the first place, they indicate the policy of the management of the corporation. That policy has been to maintain prices as steadily as possible. As competition in these lines increased the question has often come up for discussion as to what the steel corporation were likely to do. The theory received strong support that the corporation would be obliged to maintain prices at a fairly high rate to keep up their earnings even if their trade should be materially cut into by competitors. But they have shown by their recent action that when the proper time came they would not hesitate to apply the knife and take a deep cut. Fear of diminished profits is evidently not to be permitted to govern the sales departments of the constituent companies. In the second place, the position of the independent manufacturers is likely, from this time forward, to be somewhat uncomfortable, except in the case of those having their own supplies of raw material. Even if raw material can be obtained in such quantities as are desired, the cost is so high as to afford but a slight margin at the new selling prices.

The reduced prices which have been made in these lines are not an indication of a shrinkage in consumption. They are the result of an increase in productive capacity. The independent producers have not only become more numerous and have not only enlarged their facilities, but the constituent companies of the United States Steel Corporation have also increased their output. The aggregate capacity in each line has therefore been swollen to a point in excess of the requirements of the country. Great as the consumption is at present, the productive facilities have gone beyond it. Even if the consumption should continue to increase it would require a heavy growth in the demand to take up the entire output of the works now in existence. There is some hope that the diminished prices may have the effect of swelling the demand, but those who are looking for an early restoration of old rates for this reason are likely to be disappointed.

Ordinarily the reduction of prices on such a variety of products would have the effect of unsettling the whole iron and steel market. Conditions now, however, are so peculiar that we may expect to find the trade not specially affected by these occurrences. Production is still considerably short of the consumption in pig iron, steel billets, rails, structural steel and plates, and those who need supplies in these lines can derive no immediate comfort from the reduced prices being made in other branches of the steel trade. It is this fact which

is making precarious the position of those of the independent mills which must look to the open market for their raw materials.

### The Tribute to John Fritz.

The banquet to John Fritz, given at the Waldorf-Astoria in this city last Friday evening, was an unusually memorable occasion. It was graced by the presence of many of the men who have contributed largely by their brains and energy to the attainment of the commanding position now occupied by this country in the production of iron and steel. While the gathering included managers of great manufacturing operations, it was perhaps most notable for the large number of men of eminence in the various engineering professions, whose names are associated with great achievements in the building of bridges, the development of mines, the design and construction of machinery and the economical application of electrical energy. They met for the purpose of honoring one who had made his life work the production of iron and steel and had carried on that work under rapidly changing conditions, meeting difficulties and successfully mastering them, fearless in attacking new problems and fertile in devising methods for their solution. In Mr. Fritz they recognize one of the pioneers in the real development of America's greatness, a man who began his career in the day of the 25-ton blast furnace, the iron rail mill and the diminutive hammer and was a leader in the creation of the highest type of steel making appliances for producing and manipulating metal in great masses. And now at the age of 80 years, but in the full possession of all his faculties, they find him abundantly able to appreciate the expression of their recognition of his work.

The selection of John Fritz as the recipient of honors at the hands of the engineering fraternity is not the result of a feeling that something of this character should be done and that Mr. Fritz is their choice after a competitive inquiry into fitness of candidates for such recognition. If a prolific inventor had been sought out for this purpose, other men could have been found with more numerous claims for distinction. His name is not now seen on patent devices used in blast furnaces or steel works. Yet as the years have rolled on and men have been tried and tested in positions of responsibility the personality of Mr. Fritz has more deeply impressed itself on the trade. Under his direction the Bethlehem Works steadily grew larger, developing from a small merchant bar mill into a rail mill, then into a Bessemer plant, and finally into a great armor plate, ordnance and general forgings factory. But always, as it grew, the name of John Fritz became more and more a synonym for true and honest work, for high quality, for precision and reliability. Revered by his workmen for his unfailing kindness and sympathy, the same qualities which endeared him to them caused him to be respected and admired by those who simply had business dealings with him. And thus the ground was prepared for the germination of the spontaneous sentiment that something should be done to perpetuate the memory of John Fritz. The banquet, of course, was simply incidental to the creation of the Fritz medal fund. But it afforded an opportunity to his many friends and admirers to meet Mr. Fritz again and pay their respects to him. The addresses delivered upon that occasion were all of the most felicitous character. We regret that our space does not permit their reproduction in full. But throughout all of them it was plainly apparent that it was as a man that John Fritz had made the deepest impression. His mechanical genius was



eulogized, his very great ability as a works manager was extolled, but his high character was the particular theme which brought out the strongest expressions. His life is a shining example to those who follow in his footsteps.

### The Duty on Steel Billets.

A queer situation has developed in the contest over the duty on steel billets. Briefly the facts are these: When the scarcity in steel became pronounced in this country and the domestic market rose steadily an opportunity came to import foreign steel, under the rate which provides that the duty shall be 0.3 cent per pound on steel valued at 1 cent per pound or less. The greater part of this business was placed with German steel works, who made low prices because the business was very seriously depressed in their own country. The leading works belong to a syndicate which aims to keep prices at home at a certain level and sells abroad at considerably lower figures. It is understood that on export orders some steel makers get rebates on raw materials from the coke syndicate and from the pig iron syndicate, or both. Importers in this country and those American consumers who purchase direct on their own account through brokers declared the purchase price in their invoices.

The United States appraisers reached the conclusion that the steel billets were being undervalued and raised some invoices above the 1 cent per pound valuation, so that the duty was advanced to 0.4 cent per pound. They did this on the ground that the market price of steel billets in Germany is the home market price and not the export price. They claimed that the German home market price was above the valuation of 1 cent per pound and that therefore the duty must be raised. From this position they have since receded, acknowledging that the German home price is below 1 cent per pound, so that the rate of duty is no longer an issue.

But there is a penalty for undervaluing imported goods, and this penal duty is a very serious matter, much more serious, in fact, than the advance in the rate of duty, amounting in some cases to more than \$6 per ton. The Appraiser in New York in a recent case advanced the invoice valuation 10 marks, which left it below the 1 cent per pound rate, but which made the importer liable for a heavy penal duty. The matter is to go to the Board of General Appraisers on appeal.

The importers and consumers of steel are therefore to be fined heavily because in their invoices they entered the actual price at which they purchased abroad and not the home market in Germany, of which they knew nothing and with which they had nothing to do. The Appraisers admit that even on the basis of the higher German home market price the rate of duty is unchanged. In other words, there was no attempt to defraud the Government, yet the importers are to be punished by heavy fines for a technicality. The matter is now before the highest administrative body, which may confirm the construction of the law announced by the lower officials. If it does, an act of injustice will be committed which will cast odium on the whole system.

Kern Dodge and Charles Day of the firm of Dodge & Day, modernizing engineers, have just returned from an extensive trip through the Middle West, where they visited many of the principal machine shops and foundries, gathering data on shop efficiency and critically comparing factory methods.

### Lake Ore Matters.

DULUTH, MINN., November 2, 1902.—Season contracts on tonnage are expiring and vessel owners are asking more money on ore and grain. They are getting an advance on what little is chartered, but the large shippers are out of the market. Shipments are pretty well up for this date. There is every indication that the fall will be a long one, and conditions are now such that vessels can ply the upper lakes practically as long as there is freight for them to move.

#### Menominee Range.

Menominee range mines have produced as follows in the past 12 months:

Dickinson County.	Tons.	Iron County.	Tons.
Chapin group.....	946,643	Crystal Falls.....	200,000
Pewabic .....	479,336	Hemlock .....	145,000
Walpole .....	60,384	Bristol .....	116,200
Aragon .....	580,688	Baltic .....	92,380
Cundy .....	190,315	Armenia .....	88,000
Penn Iron Mining Com- pany .....	251,500	Columbia .....	85,022
Loretto .....	95,618	Dober .....	84,748
Traders .....	94,418	Riverton .....	79,399
Quinnesec .....	82,983	Hiawatha .....	63,000
Verona and Vivian..	64,100	Tobin .....	60,000
Millie .....	23,400	Mansfield .....	58,769
Groveland .....	12,000	Michigan .....	43,180
Curry .....	16,500	Lamont .....	25,000
Northwestern .....	1,000	Hope .....	4,264
Explorations .....	8,800		

A number of explorations are under way in each county, and numerous shafts are being sunk. The United States Steel Corporation own the Chapin, half the Pewabic and Walpole, the Aragon and Cundy, the Columbia, Dober, Riverton, Mansfield, Michigan and Hope. In Iron County Corrigan, McKinney & Co. are the largest operators, with the Crystal Falls, Armenia, Tobin and Lamont. They also have the Quinnesec and Groveland in Dickinson County. Pickands, Mather & Co. have the Hemlock, Baltic, Verona and Vivian.

It is expected that fully 5,500,000 tons will be shipped from Escanaba this year, putting that port once more in the lead. The Chicago & Northwestern road has shipped 3,400,000 tons to date, and the St. Paul road 1,300,000 tons. The Northwestern is now moving 25,000 tons daily. The biggest ore train ever hauled into Escanaba was last week, when one locomotive of the Escanaba & Lake Superior road, a new line, pulled 85 loaded 100,000-pound cars. The revenue load was 3,580 tons, and maximum drawbar pull of 4800 tons was exerted. The train moved at an average speed of 12 miles an hour.

The Oliver Iron Mining Company have valuable ore lands lying adjoining the Great Western mine that are liable to be opened into shortly. It is generally conceded that these lands contain a very large deposit of ore and may make the biggest mine ever opened in Crystal Falls.

#### Marquette Range.

A steam shovel has been put into the Hartford mine for the first time and several thousand tons are being sent out. The Cleveland Lake mine will be operating through a new shaft some time next year. All the ground on which buildings around the present shaft are located is over ore and it is for this that the new one is being sunk. It will have four compartments of large size. The immense stock piles at this shaft and at the Lake Superior lake shaft are about gone, and will be cleaned up this year for the first time in many seasons.

Thirty-three mines have been in operation in Marquette County the past 12 months, most of them to their full capacity. These employed 5518 men, a gain of 318 over the year before. There were 29 men killed during the year. Of these 10 died at one time in the cave in of the old Negaunee operations.

The large charcoal furnace of the Cleveland Cliffs Company at Marquette will not blow in till next spring. An intake pipe 1800 feet long and carrying a double inlet 30 feet high is now being sunk in Lake Superior for the furnace pumping plant.

#### Mesaba Range.

The Cleveland Cliffs Iron Company, who have a number of Mesaba tracts under option, 30 of them in

a bunch in the southwest corner of 57-22, have located some ore there, but do not yet know the importance of their find. Ore was found on this property when the company took the option, but more has been located since then. Pickands, Mather & Co., who took the Elizabeth mine a few weeks ago, have continued exploration there and are finding the ore body considerably larger than was figured, though possibly not larger than was expected. It is the usual experience of Mesaba deposits that they grow with continued explorations for a long time. A State lease in section 24 57-22, north of the new Little mine purchase of the Clairton Steel Company, has been taken by local parties on an option for \$100,000 for the lease and will be vigorously explored at once. The Wills, a new mine in which officers of the Republic Iron & Steel Company are interested, has begun shipping and will send out about 15,000 tons this fall. It is an underground property and is to be developed for a considerable shipment another year. Grant mine, a State lease belonging to Jones & Laughlins, has closed for the year, having shipped its expected amount, 52,000 tons. It contains a very large deposit, perhaps 10,000,000 tons, of non-Bessemer siliceous ore. A large shaft will be sunk this winter and much more ore will be sent forward next season. At the Kinney mine stripping a night crew has been put on and the mine will be a large shipper next year. It belongs to the Republic Iron & Steel Company. It will be operated on the milling system. Sharon mine of the Sharon Steel Company has been able to make a far better shipment this year than was expected, and will probably reach the 250,000 tons planned. During the winter the choked drifts will be reopened and the mine made ready for a large business. A large amount of stripping has been done this year, and the mill pit is now quite large. In all 325 men have been employed this season. The mine is now known to be a very large property, continued exploration having developed an immense body of ore on all sides of the original location. The Great Northern road has an option on the State lease owned by the Mesaba Mining Company, in section 23 57-22, and will doubtless avail itself of the right, which calls for purchase at \$65,000. This mine has had a checkered career and has been explored by good parties three or four times unsuccessfully, and by others as many times with like results. It is now claimed that an excellent body of ore is being found.

Trouble has been caused at Two Harbors by the shifting and sliding of ore dock No. 4, which was rebuilt and raised last winter. It is now a dock of 37,000 tons capacity and of sufficient height for the largest ships. It will not be used for the rest of this season and will be rebuilt again the coming winter.

As soon as ore cars are idle a great many of them will be sent to the coal regions for the winter. Already a large number of these cars have gone East from the Gogebic. Thousands of hopper cars are stored every winter all about the iron region and some of these can possibly be used to advantage in the East, D. E. W.

### The Economy of High Steam Pressure.

The following is an extract from an address made by T. C. Best of Chicago, president of the Master Steam Boilermakers' Association:

Between the years 1860 and 1870, when steam pressure used for marine engines was about 30 pounds by boiler gauge and the steam expanded in a single cylinder, the amount of coal consumed by the best engineers was about 4 pounds per indicated horse-power per hour. On the introduction of the compound engine, the consumption fell to a little over 2 pounds per indicated horse-power per hour. The triple expansion engine has reduced this to as low as 1.4 pounds per indicated horse-power per hour, and the quadruple expansion engine still further reduces the consumption by about 10 per cent. It may be well to call your attention to the fact that steam in contact with water from which it is generated is said to be saturated. It is then at its maximum density and pressure for a given temperature. Saturated steam, under a given pressure, has a fixed temperature. Both the temperature and the density in-

crease with the pressure, but the total heat increases in a very slow ratio compared with the pressure and temperature, there being only a very small increase of total heat per pound of steam as the pressure increases. This is an important point in practice when considered in reference to coal consumption, for it shows that it is not very much more costly as far as fuel is concerned to generate high pressure steam than low pressure steam, weight for weight, and far more work can be obtained from high pressure steam than low pressure steam when used expensively, and hence the economy of high pressure steam. This discovery necessitated stronger boilers and better workmanship. Our fathers' ways of doing work had to be abandoned and better ways had to be brought into use.

### Central Pennsylvania News.

HARRISBURG, PA., Nov. 1, 1902.—All the blast furnaces at the works of the Pennsylvania Steel Company at Steelton were banked all of this week on account of having no fuel with which to operate. The week has been the dullest at the mills since the commencement of the strike in the hard coal fields, but relief is said to be in sight, and it is expected that the works will be operated in full next week. The Bessemer mill, the rail mill and No. 1 blooming mill were also closed this week by lack of fuel, and the open hearth department was compelled to suspend for one day and reports a light output for the week. The first carload of anthracite received since the commencement of the strike arrived to-day and more is on the road. A large electrical substation was put in operation in the merchant mill department of the steel company this week to furnish power for the operation of the works south of that department.

The Central Iron & Steel Company, despite frequent delays on account of fuel scarcity, closed the first six months of their fiscal year to-day with a record breaking production of 70,000 tons. A comparatively few years ago this company's total production amounted to only 8000 tons per year. The plants of the Central Company will be closed Monday for stock taking. This week they completed a large order of steel for coke ovens for the Maryland Steel Company, and are now turning out sheet steel to be used in covering the docks of the North German Lloyd steamship line.

The Harrisburg Mfg. & Boiler Company have no fuel with which to operate and are not receiving orders this week. The company have on hand large orders for export. Manager J. P. Luce of the Lalanc & Grosjean tin plants hopes to have the large additions to that industry complete by December. The tin mill is the one industry of Harrisburg that has not been inconvenienced by the coal famine.

Repairs are being made to the Chickies furnaces at Chickies. No. 2 Furnace will be ready for service in about two weeks. There is considerable work yet to be done on No. 1.

Operations at the York Rolling Mill were suspended Monday and the works closed for an indefinite period.

The Pullman Steel Ventilator Company of York have bought a tract of land adjoining their present plant for the purpose of increasing their capacity.

The suit of Reinold Betterman against the Cambria Foundry & Machine Company of Johnstown has been non-suited. Betterman claimed \$140,000 for alleged infringements of patents. The company this week announced their intention of constructing an additional plant in Johnstown.

The York Bridge Company have been awarded the contracts for bridging several streams in York County.

The South Chester Tube Mill have received a large supply of coal, and are now operating on full time.

The Keeler Boiler Works, at Williamsport, have increased their output by putting on a night force of workmen to fill rush orders.

It is announced that the American Pipe Mfg. Company of Philadelphia will erect an electric power plant at York Furnace, along the banks of the Susquehanna River, in York County, to generate 40,000 horse-power.



The company will be capitalized at \$5,000,000. Another plant of 35,000 horse-power capacity is proposed for Conewingo Falls, and a third at Peach Bottom. It is proposed to supply the large industries of Wilmington, Del., and Chester, Pa., with power at a low cost.

Jacob Geise, paymaster for the Danville Stove & Mfg. Company, has resigned.

The Philadelphia & Reading Railway Company's new locomotive shops at Reading, which have been built at a cost of nearly \$2,000,000, are almost completed, and the company expect that by the first of the year they can begin to build their own locomotives, as was done in former years. The new plant consists of ten immense structures and has been two years in building. It is fitted with the latest machinery and is considered one of the most complete locomotive shops in the world. At present the Reading engines are built by the Baldwin Company.

The Emmert Mfg. Company of Waynesboro have shipped to Warsaw, Russia, a No. 1 Universal vise to be exhibited at the Warsaw Industrial Convention. The Landis Tool Company of Waynesboro will resume operations on Monday after a short shut down. The Geiser Mfg. Company of the same place yesterday shipped six large engines to Rome, Ga.

The following charters were granted during October at the State Department in this city:

The Manufacturing Company, Pittsburgh; capital, \$1000. Directors: J. B. Flint, G. W. Kratz, J. W. Stuart, T. C. Edwards, A. E. Anderson, Pittsburgh.

Edward Darby & Sons Company, Philadelphia; for the manufacture of wire cloth, wire work and wire goods of every description; capital, \$150,000. Directors: Edward Darby, E. J. Darby, H. F. Darby, Philadelphia; George B. Darby, Baltimore.

Hermance Machine Company, Williamsport; capital, \$30,000. Directors: A. D. Hermance, C. D. Marsh, John R. T. Ryan, J. T. Fredericks, Williamsport.

Williamson Mfg. Company, Bradford; capital, \$50,000. Directors: E. S. Williamson, Buffalo, N. Y.; T. H. Kennedy, T. A. Sangster, W. S. Gaffney, H. S. Bemis, Bradford.

Beaver Valley Metal Valve Company, Pittsburgh; capital, \$10,000. Directors: W. D. Berry, New Brighton; George T. Hildebrand, Joseph H. Barton, Pittsburgh.

Pittsburgh Block & Tackle Company, Pittsburgh; capital, \$40,000. Directors: George F. Murray, Eli Burford, Pittsburgh; Nelson Furgeson, Ben Avon.

The Universal Heater Company, Philadelphia; capital, \$1000. Directors: D. E. Bellwe, W. J. Harris, Rees Welsh, Philadelphia.

Penn Valve & Fitting Company, Hunker, Westmoreland County; capital, \$20,000. Directors: John Pop-penger, J. S. Lowe, O. O. Evans, C. H. Long, William Felker, Greensburg.

### The Bristol Furnace Accident.

D. Davies, general manager of the Virginia Iron, Coal & Coke Company, Bristol, Va., advises us that the accident which occurred at the Bristol Furnace on the 18th inst. resulted from the neglect of the stove man, who was changing a leaky tuyere, to make proper arrangements of draft, thus allowing the gases to flow into the cold air pipe, producing an explosion which blew out the four valves connecting with the stoves, as well as those connecting with the engines. While the explosion was a severe one, no one was hurt and the loss to the company was not great. Arrangements were immediately made to blow in the Crozer No. 1 Furnace, which had been idle from a shortage of coke, to take the place of the Bristol Furnace. Repairs are rapidly being made on the damaged stack, and the furnace will probably be blown in within a few days if enough fuel can be obtained. The company produce 36,000 tons of coke per month, but this is insufficient for their requirements, and they are obliged to depend on the Stonega and Pochontas companies for 15,000 tons of coke monthly. Strikes and the congested traffic on the railroads have prevented the latter company from supplying the necessary amount of fuel which has resulted in the Virginia Iron, Coal & Coke Company blowing out two furnaces. These stacks

only await ample fuel to blow in. With the second Crozer Furnace the Virginia Company will have eight furnaces in blast, with a monthly output of over 30,000 tons of pig iron.

### Pacific Coast News.

SAN FRANCISCO, CAL., October 27, 1902.—The rains of the past week have come in good time. Every part of the State has been visited, from the borders of Oregon to San Diego, and the farmers are everywhere jubilant. Plows will be started in every section of the State by these rains, and people will look forward with renewed confidence to the coming year. The same rains have done some injury to late grapes, &c., but it is always the same—some one is ever caught out. The fall trade continues to be of good volume, and the hardware and metal trades are like every other, flourishing. The Clearing House exchanges continue to show a wonderful increase over those of last year. They are a true index of our prosperity. The big prices for farm produce being offered in the country without finding takers are giving a great impetus to the trade in agricultural implements. Farmers have some encouragement to put in crops now.

The import trade by sea in this line has been fairly active of late. The Panama steamers have brought to hand considerable hardware, merchant iron, pipe, &c., while we had some more English pig iron during the past two weeks. The "Falls of Haladale" had 600 tons, the "Metropolis," with 400 tons more, making altogether about 1400 tons. We have had more English pig iron than we have had in a long time. We have also had a large invoice of quicksilver flasks from Antwerp—4750 by the "MacMahon." By the way, there have been a great number of French sailing vessels to hand this year. They get a bounty from their home Government. They have driven down the rate of charter on grain to Queenstown from about 30 shillings to 16 shillings 9 pence.

The export trade continues to be fairly active since May 22. The clearances for the Hawaiian Islands have been kept at the Custom House, and I have compiled the totals from May 22 to October 1., three months and one week. They have been as follows:

Agricultural implements.....	\$6,782
Brass manufactures.....	13,077
Bicycles.....	6,672
Electrical instruments.....	15,576
Scientific instruments, other.....	7,925
Bar iron, 208,819 pounds.....	6,188
Sheet iron, 2150 pounds.....	70
Steel bars, 75,986 pounds.....	2,510
Steel plate, 12,177 pounds.....	401
Steel railroad bars, 20 tons.....	800
Tin plate, 14,000 pounds.....	694
Wire, 23,286 pounds.....	473
Locks.....	18,975
Saws.....	491
Tools.....	14,292
Castings.....	51,853
Firearms.....	3,764
Cutlery.....	5,872
Sewing machines.....	9,843
Boilers and parts of.....	3,940
Machinery.....	86,344
Wire nails, 602 kegs.....	1,907
Pipe.....	49,601
Safes, 13.....	2,544
Scales.....	1,226
Stoves.....	7,219
Pumps and pumping machinery.....	12,052
Printing presses.....	276
Electrical machinery.....	38,138
Typewriters.....	2,014
Locomotives, 1.....	2,200
Hardware, various.....	84,036
Cash registers, 8.....	683
Total.....	\$458,440

These figures show a great falling off in trade in iron, steel and hardware with the Hawaiian group. They represent an average of not quite \$2,000,000 a year. For the first six months of 1900 the grand total of similar exports reached a figure in excess of \$2,000,000, whereas six months at the average of the figures for the year here given would not be over \$1,000,000, a figure only equal to half that of the year 1900. I shall return to this subject again. The results are disappointing in the extreme.

J. O. L.

English Production Statistics.

Pig Iron.

The make of pig iron in the first half of 1902, as ascertained by the British Iron Trade Association, amounted to 4,096,478 tons, against 3,884,544 tons for the first half of the previous year and 4,540,403 tons for the first half of 1900. The situation for the first half of the current year has therefore been a substantial improvement on that of 1901, although far from equaling the much more prosperous conditions of the year 1900. An examination of the district totals shows that the increase in the one case, and the decrease in the other, are pretty well distributed over the whole country. In all three cases the largest producing district is that of Cleveland, which fell from a total of 1,054,682 tons in the first half of 1900, to 923,904 in the corresponding period of 1901, but rose again to 990,082 tons in 1902. The adjacent district of Durham has varied but little over the period in question, while West Cumberland, which rose to 451,759 tons in the first half of 1900 and fell to 391,722 tons in the first half of 1901 has again risen to 430,127 tons. Speaking generally, indeed, there is an all round recovery from the extreme depression which characterized the first half of 1901, and the rate of pig iron output has once again gone materially over 8,000,000 tons per annum, with a chance of a substantial further rate of increase before the close of the year.

The production of the different grades was as follows during the first six months of 1901 and 1902.

	1901. Tons.	1902. Tons.
Forge and foundry.....	1,765,184	1,861,337
Hematite .....	1,657,957	1,766,805
Basic .....	374,707	364,050
Spiegel, &c.....	86,696	104,286
Totals.....	3,884,544	4,096,478

Open Hearth Steel.

The make of open hearth steel in Great Britain for the first six months of 1902 was 1,771,038 tons, which is an increase of 140,080 tons on the output for the corresponding period of 1901, and is the largest output recorded for any six months in the history of the open hearth steel manufacture. This is probably a better result than was generally anticipated in the presence of the continued severity of German competition. On the other hand, there has not only been little competition on the part of the United States, but America has taken during 1902 considerable quantities of British open hearth steel. The production of the different districts was as follows:

Open Hearth Steel Product, First Six Months.

	1902. Tons.	1901. Tons.
Scotland .....	523,786	493,404
Northeast Coast.....	435,004	473,425
North and South Wales.....	424,357	316,440
Lancashire and Cumberland.....	149,936	75,732
Sheffield and Leeds.....	125,306	174,633
Staffordshire and Lincolnshire.....	112,649	97,324
Totals.....	1,771,038	1,630,958

The production of acid steel was 1,529,963 tons during the first half of 1902, as compared with 1,473,996 tons during the corresponding period of 1901.

Bessemer Steel.

The production of Bessemer steel ingots in the United Kingdom in the first half of 1902 has been ascertained by the British Iron Trade Association to have been 888,378 tons, which is an increase of 96,453 tons on the output of ingots for the first half of the previous year. This increase has been distributed over the whole of the principal steel producing districts, as the following details show:

Make of Bessemer Steel Ingots in the United Kingdom in the First Half of 1902, Compared with the First Half of 1901.

District.	1902. Tons.	1901. Tons.
South Wales.....	207,939	204,578
Cleveland .....	177,828	152,773
Sheffield and Leeds.....	159,499	131,728
Cumberland and Lancashire.....	270,627	241,681
Staffordshire, &c.....	72,485	61,165
Totals.....	888,378	791,925

The quantity of basic Bessemer steel produced in the first half of 1902 was 324,902 tons, while the output of steel by the acid Bessemer process was 563,476 tons.

The Standard Steel Car Company.

Capitalists identified with the Standard Steel Car Company of Pittsburgh, who have just completed new works at Butler, Pa., for the manufacture of steel cars, have secured control of the Southern Car & Foundry Company. The Southern Car & Foundry Company operate a rolling mill, four complete car building works and one building, a car wheel works and a car axle works. The rolling mill is known as the Anniston Works and is located at Anniston, Ala. The product is iron and steel car axles and merchant bar iron, the annual capacity being 9000 gross tons forged and 30,000 tons of rolled products. The plant is owned by the Illinois Car & Equipment Company, but has been operated under lease for some time by the American Car & Foundry Company. The four car works consist of the Anniston Works, at Anniston, Ala., with an annual capacity of 12,000 freight cars; the Gadsden Works, at Gadsden, Ala., with an annual capacity of 3600 wooden freight cars; the Lenoir Works, at Lenoir, Tenn., with an annual capacity of 3000 standard freight cars, and the Memphis Works, at Binghamton, a suburb of Memphis, Tenn., with an annual capacity of 4500 cars. The new plant is the Birmingham Works, under construction at Ensley, Ala., which will have an annual capacity of 4000 steel cars. The car wheel plant of the Southern Car & Foundry Company is located at Memphis, Tenn., and has an annual capacity of 65,000 freight and passenger car wheels. The car axle works, at Anniston, Ala., have a daily capacity of 120 axles. It is the intention of the Standard Steel Car Company to very materially enlarge the capacity of the different plants of the Southern Car & Foundry Company. J. M. Hansen, president of the Standard Steel Car Company, has made the following statement in regard to the purchase: "We think these properties are of special value, as they are located in close proximity to the valuable iron ore deposits of Alabama, and are also in touch with the great Southern lumber districts from which the supply of the car company is secured. The Southern Company occupy a peculiarly advantageous position for building either wooden or steel cars, as they are in such close proximity to the raw material for either grade of cars. The standard Steel Car Company, as a company, will not be interested in the new enterprise, but the relationship will be close and their interests will be identical. The Southern Company have been turning out steel under frame cars for a time, but the new owners of the concern will increase this branch of the business materially. All steel cars will be built also in the near future."

The officers of the Southern Car & Foundry Company are J. M. Elliott, Jr., president and manager of plants; George E. Eikes, vice-president; C. L. E. De Gague, secretary, and W. G. Brokway, treasurer. It is probable that in the near future a new Board of Directors will be elected and also new officials for the executive department. The Standard Steel Car Company take charge of the affairs of the American Car & Foundry Company at once.

At the forthcoming meeting of the American Society of Mechanical Engineers the following papers are to be presented: Wm. Kent, "Heat Resistance, the Reciprocal of Heat Conductivity;" F. A. Halsey, "The Metric System;" "Final Report of Committee on Standardization of Engine Tests;" S. A. Reeve, "A Rational Solution of the Problem of Weights and Measures;" C. H. Robertson, "Tests of a 12 Horse-Power Gas Engine;" W. Trinks, "Deflection of Beams by Graphics;" S. A. Reeve, "Entropy Analysis of the Otto Cycle;" A. F. Nagle, "Analysis of the Commercial Value of Water Power;" C. T. Porter, "Finer Screw Threads;" Henry M. Lane, "Filing System for Office Use;" Frank Richards, "Gift Proposition for Paying Workmen;" W. I. Slichter, "Fly Wheel Capacity for Engine Driven Alternators;" J. M. Barnay, "Forty-four Foot Pit Lathe;" C. C. Tyler, "Surveying Instruments in the Machine Shop;" J. T. Wilkin, "Rotary Pumps;" J. C. Riley, "Continuous Record of Engine Governor;" B. Viola, "Centrifugal Machines and Their Uses;" Albert Kingsbury, "New Oil Testing Machine."



## MANUFACTURING.

### Iron and Steel.

Victor Beutner, consulting engineer, Westinghouse Building, Pittsburgh, states that the new plant of the Susquehanna Iron & Steel Company, at Columbia, Pa., is well under way. The brick buildings are completed and the steel buildings will soon be finished. The four pipe furnaces are ready for operation and the machinery for the plant will be ready for shipment in a few days. The equipment will include new designed rolling and welding machines. The three-phase electrical system will be used to drive all the machinery. The plant will be ready for operation by the middle of January and will provide a daily output of 120 tons of pipe. Mr. Beutner also reports good progress in the construction of the United Steel Company's plant at Canton, Ohio, of the construction and equipping of which he has entire charge. The company have decided to put in a complete system of plate bar tables, which will increase the daily output of bars to 600 tons. A 36-inch universal mill of new design will also be installed. The company expect to be making steel by January and will have the entire plant in operation by April.

The Sharon Tin Plate Company, Sharon, Pa., manufacturers of tin and terne plates, are operating 10 of their 20 hot mills.

The Shenango Furnace Company of Pittsburgh, operating three blast furnaces at Sharpsville, Pa., have been granted a Minnesota charter. Headquarters have been opened in Duluth, where W. J. Barrows, Jr., has assumed charge of the mining business of the company.

Some extensive improvements and additions are being made to the Cambridge Works of the American Sheet Steel Company, at Cambridge, Ohio. A new annealing department is being added and the galvanizing department is being enlarged. A new building, 60 x 160 feet, is being erected, commanded by an electric crane. This plant contains seven hot mills, but has been idle for some time.

The blast furnace of the Manistique Iron Company, Manistique, Mich., was blown in on October 24. The furnace was obliged to go out of blast about two months ago because of fire at the chemical works. Under ordinary circumstances the furnace would have continued in active operation for another year, but the company decided to take advantage of the enforced idleness to reline the stack throughout, put in new jackets and new charging apparatus, with new gas seat at the top. A new Westinghouse dynamo, 650 lights, will also be installed at the plant in a few days. For two and a half years prior to the fire the furnace was in active operation continuously, its daily run averaging more during that period than at any time during its history. W. H. Nelson, manager, advises us that the plant is in prime condition. The blowing in of the furnace was attended by an interesting social function.

The annual meeting of the Firth-Sterling Steel Company of Pittsburgh was held last week. The following directors were elected: Lewis J. Firth, Austin A. Wheelock, J. W. Kinnear, James H. Willock and Eben B. Clark. The directors subsequently re-elected the old officers as follows: Lewis J. Firth, president; A. A. Wheelock, vice-president; Eben B. Clark, treasurer and manager, and James E. Porter, secretary. The company are manufacturers of high grade crucible steel and projectiles. George H. Firth is superintendent of the steel department and C. B. Wheeler of the projectile department.

The north rolling mill of the Republic Iron & Steel Company at Terre Haute, Ind., was closed down November 1 for an indefinite period. The South mill in the same city will be put on triple turn.

Follansbee Brothers Company, Pittsburgh, manufacturers of and dealers in tin plate and metals, are sending out invitations to their friends to visit their new offices and warehouses just completed at Liberty and Short, Second and Third avenues, in that city.

The Whitaker Iron Company, Wheeling, W. Va., an identified interest of the Wheeling Corrugating Company, Wheeling, W. Va., will have their three new 26-inch sheet mills in operation early next year. They now have eight mills operated partly on sheets and partly on tin plate. Plans now under way contemplate four additional sheet mills.

The Penn Iron & Coal Company are replacing their old blast furnace at Canal Dover, Ohio, with a new one, 85 x 20 feet, equipped with a skip hoist. The capacity of the new stack will be about 50 per cent. larger than the old one. The old blowing engines will be utilized and also the four hot blast stoves. They expect to have the new stack in operation in December next.

The Gruson Iron Works of Eddystone, Pa., which have been temporarily closed owing to the breaking of the piston rod on the main engine, resumed work on Wednesday morning of this week. Robert Wetherill & Co. of Chester made the repairs.

The Juniata Steel & Iron Company, Greencastle, Ind., organized in January, advise us that they will manufacture at the start black terne and tin plate, and in the near future will probably add other finished products. F. M. Strong is president.

### General Machinery.

The new plant of the Marlon Machine & Tool Company, Bowling Green, Ohio, has been placed in operation.

Spencer Hall, Racine, Wis., is erecting a machine shop at Park avenue and Fourteenth street for the manufacture of a patent check hook in addition to the line of bicycles that he has previously manufactured.

The Gillett Machine Shop, Gillett, Wis., is reported by J. M. Frisbie, the proprietor, to be completed. Engines, boilers and machinery will be manufactured and repaired.

S. J. Shimer & Sons of Milton, Pa., have bought out the Ettinger Machine Company, Limited, located at Chester. Shimer & Co. will continue the manufacture of the Ettinger cutter head as well as their own at the Milton plant. The Ettinger Machine Company were organized in 1897.

Considerable machinery will be required by the Silver Bow Foundry & Machine Company, Butte, Mont., for the new plant they are to build in Salt Lake City, Utah. They advise us that if they can dispose of their present plant entire new equipment will be installed; otherwise the machinery they now have will be removed to the new quarters and some additional machines purchased. The company manufacture mining machinery, bronze, copper and phosphor bronze castings. The officers are William Read, president and manager, and R. May, secretary and treasurer.

The Champion Candy Machine Company, Philadelphia, will enlarge their plant by the erection of a two-story addition, 30 x 60 feet. Very little new machinery will be required.

The Elkhart Frog & Crossing Works, which were recently incorporated at Elkhart, Ind., with a capital stock of \$30,000, have organized by the election of J. W. Fieldhouse, president; E. Goldthwait, vice-president, and F. A. Reed, secretary and treasurer. The company have decided to erect a machine shop 50 x 128 feet, a foundry 50 x 60 feet, and an office building 20 x 30 feet. All buildings are to be of brick construction.

The National Drill & Mfg. Company, Chicago, have secured 10 acres of ground at Barberton, Ohio, where they are constructing works for the manufacture of road machines. Contracts have been let for the building of a forge and machine shop, wood shop and storehouses. All the buildings are substantially constructed of brick with slate roofs. By terms of the contract the plant is to be finished and fully equipped with machinery by January 1. E. R. Stettinius is president and treasurer and A. Cameron is vice-president and secretary. Sales offices have been established at the principal centers throughout the United States; also at Yokohama, Japan; Havana, Cuba; Johannesburg, S. A. R.; City of Mexico, Buenos Ayres, Melbourne, Australia, and Sydney, N. S. W. Officers of the Stirling Company are financially interested in the enterprise.

The W. W. Whitehead Company, Davenport, Iowa, manufacturers of heavy machinery and light locomotives, have changed their name to the Davenport Machine Works.

The National Machinery Company of Tiffin, Ohio, state that the condition of business was never better in their history than it is at present. Orders received during the last 30 days have been exceptionally heavy. Judging from the amount of orders on hand and the inquiries received the company do not anticipate any falling off in the present volume of trade for some time to come. The activity among the railroads has greatly increased the amount of business this fall, and the only difficulty encountered is to make early deliveries, which is greatly impeded by the condition of the raw material market. The company have experienced an exceptional year in the wire nail machine trade, but find business equally as good in all their other lines—bolt cutters, headers, bulldozers, spike machines, &c.

### Foundries.

The new foundry of the Filer & Stowell Company of Milwaukee, Wis., which is now being constructed, is located a mile south of their old plant at the corner of Beecher and Zieme streets. The new works will have excellent shipping facilities by way of exclusive spur tracks running from the Chicago, Milwaukee & St. Paul and Chicago & Northwestern railways. In addition it will be connected with the old plant by private railway track. Two lines of electric cars will afford easy access to the property. The main building, including ovens, will be 245 x 400 feet, or 220 x 400 feet without ovens. There will be two main spans of 85 x 400 x 36 feet to the crane hooks. The main spans will have three electric cranes with two 30-ton trolleys on each bridge. The wing will have three 15-ton cranes. The storage, coke and iron sheds will be elevated a foot above the charging floor, so that coke and iron can be tracked direct to the cupolas from the cars or from the sheds. Power will be furnished by a 300 horse-power compound condensing engine. Three independent water tube boilers will be used. At the cleaning end of the foundry a track will run across the shop so that castings can be loaded on cars from either one of the three spans. Many appliances that will contribute to convenience and facilitate work will be used. The estimated capacity of the foundry is 2500 tons clean castings per month. The company own 50 acres where the foundry is located.

The Downington Mfg. Company, Limited, East Downington, Pa., contemplate the erection of a new foundry, 100 x 120 feet.

The Buckeye Malleable Iron & Cupola Company, Columbus, Ohio, started their new steel casting plant October 14, and since then have been operating one furnace. The other two furnaces will be ready in about two weeks, and when all are running full the plant will have a daily capacity of about 200 tons. This is said to be one of the largest and best equipped steel casting plants in the country.

The contract has been let for rebuilding W. D. Williams' foundry in Fredericksburg, Va., which was destroyed by fire some months ago.

The Nevada Foundry at Reno has been purchased by Mr. McCone, proprietor of the Fulton Foundry at Virginia, Nev., in connection with other financial interests. It is intended to consolidate the two foundries and to increase the capacity of the plant by additional buildings and installing new equipment.

The Ground Hog Plow & Foundry Company, Clarksville, Tenn., have completed their organization by electing the following officers and directors: J. M. Macrae, president; J. R. Rossetter, vice-president; W. M. Drane, Jr., secretary and treasurer; C. H. Drane, general manager; H. C. Merritt, B. W. Macrae and Matt Gracey. The company have bought the business of Drane & Co. and will enlarge the plant for the manufacture of the Ground Hog chilled plow, patented by Mr. Rossetter.

The Monongahela Foundry & Forge Company, Monongahela City, Pa., manufacturers of machine molded castings, will install an electric light plant and heating and ventilating system in their works. Contract for the electric plant has been awarded. The company have completed improvements to their general foundry and are prepared to make gray iron castings of all descriptions. It has a capacity of 30 tons daily, 18 tons in the machine molded casting departments, and 12 tons in the general foundry. In the machine molding department specially designed machines are used, covered by patents of the company, which will accurately mold pieces from 8 ounces to 150 pounds. The plant covers two acres of ground and comprises a modern equipped foundry, machine and pattern shop and storage department. Several large orders for all sizes of machine molded pipe balls are being filled.

The annual meeting of the Penn Steel Casting Company of Chester, Pa., was held on Monday at the company's office. The report of the officers showed that the company were in a prosperous condition and the stockholders are pleased with the progress made. The officers and directors were re-elected as follows: President, M. H. Bickley; secretary and treasurer, George M. Booth. The directors were Frederick Baldt, Sr., M. H. Bickley, J. W. Hawley, George M. Booth and G. Max Bernard.

#### Boilers, Engines, &c.

Plans are reported under way by which a large gas engine works will be built at Wheeling, W. Va. There is said to be quite a demand for gas engines for use in the extensive oil fields in that state.

Jacob S. Reninger, secretary Water Board, Allentown, Pa., informs us that the commissioners are about to locate a site for the pumping station for the proposed new water supply from Schantz Spring.

The engineering department of the Pittsburgh Gage & Supply Company, Pittsburgh, Pa., has been unusually rushed with work during the past few days. Recent orders are for one 150 horse-power boiler for the Lincoln Fire Brick Company, Bolivar, Pa.; one 150 horse-power boiler for the American Porcelain Company, New Brighton, Pa.; one 150 horse-power boiler for the Keystone Mining Company, Leadville, Col., and one 35 horse-power automatic engine for the Clearfield Steam Laundry Company, Clearfield, Pa.

The Willimantic Traction Company, Willimantic, Conn., will erect a power house at South Windham, details of which are not yet available.

The American Blower Company, Detroit, Mich., have recently booked a number of large orders, including heating plants for the Lackawanna Steel Company's roll shop at Buffalo, N. Y.; Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa.; Fox Typewriter Company, Grand Rapids, Mich., and the National Malleable Castings Company, Sharon, Pa.; also the entire drying apparatus for the new starch factory of Piel Bros., in Indianapolis.

The Southern Engine & Boiler Works, Jackson, Tenn., state that the new machine shop which they are building will be finished and equipped by December 1. The increased facilities will place the plant in the first rank among Southern industries. An additional story is also being added to the office building.

The Louisville Water Company, Louisville, Ky., are asking bids until December 20 for pumping engines of 24,000,000 and 30,000,000 gallons capacity and boilers and furnaces to meet the requirements of the engines. Charles R. Long is president.

H. F. Arndt, Light Commissioner, North Amherst, Ohio, advises us that bids will be received until December 2 for the proposed \$10,000 municipal lighting plant. A 120 horse-power gas and gasoline engine and two 45-kw. alternators will be required.

#### Bridges and Buildings.

The Globe Iron & Wire Works, having offices at 35 to 41 Indiana street, Chicago, have been incorporated with a capital

stock of \$100,000. The new company are a consolidation of the interests of H. A. Streeter, Globe Iron Works, Dolan & Cummings and the Garden City Wire & Iron Works, and the officers are John J. Cummings, president; C. H. Wilcox, vice-president; W. B. Frollichstein, secretary and treasurer. The directors are H. A. Streeter, C. H. Wilcox, Thos. Doolan, W. B. Frollichstein and John J. Cummings. H. A. Streeter and Thomas Doolan are both pioneer business men of Chicago. Mr. Streeter, having been engaged in the iron business since 1868, and Mr. Doolan since 1888, will retire from active business life, though acting as directors of the new corporation. President Cummings was formerly a member of the firm of Doolan & Cummings. Mr. Wilcox, who was chosen for vice-president, was formerly president of the Calumet Iron & Steel Company. The business policy of the new company will be the same as that heretofore followed by the concerns incorporating and the capacity of the plant will be more than trebled. The line of manufacture will include architectural, structural and ornamental iron, steel, art brass and wire work.

A charter has been applied for by the Somerville Engineering Company, who recently opened offices in Pittsburgh and are doing a general engineering business for the building of iron and steel structures of all kinds. The incorporators are A. T. B. Somerville, E. H. Catling and Henry L. Evans.

The Nashville Bridge & Construction Company, Nashville, Tenn., will shortly increase their capital stock to \$30,000 and will erect a new plant on a 5-acre site which they recently purchased on the Cumberland River. There will be two buildings, 70 x 140 feet, equipped with modern machinery, all of which has been purchased. The company have been crowded with work since they incorporated about 15 months ago, and have on hand over \$100,000 in uncompleted contracts. The officers are John D. Anderson, president; Watkins Crockett, vice-president; R. D. Goodlett, secretary and treasurer, and A. J. Dyer, engineer and general manager.

The Decatur Bridge Company, who are to erect a plant at Decatur, Ill., will incorporate with a capital stock of \$30,000. The organization has been completed by the election of the following directors: E. R. Tyler, W. Melville Wood, G. A. Caldwell, all of Muncie, Ind.; T. L. Blackburn, Lincoln Ind.; J. R. Challacombe of Hillsboro and Frank W. Ives of Bloomington, Ind.

#### Fires.

The National Horse Nall Company's works at Vergennes, Vt., were destroyed by fire last week. The loss is about \$50,000.

The plant of the Ray Chemical Company, Detroit, Mich., was destroyed by fire October 31. The loss will reach \$75,000.

#### Hardware.

A Duluth, Minn., company for the manufacture of patent horseshoes has been organized with a capital stock of \$120,000. W. R. Baumbacher, president of the First National Bank of Wadena, is president of the new company, and Otto Swanstrom, the patentee of the horseshoe, is superintendent of the factory. The company are installing machinery in a brick building 50 x 80 feet. A drop forge weighing 42,000 pounds and having a 3000-pound steam hammer is being installed. The machine is of a new pattern specially applicable to the manufacture of the patent horseshoe the company are putting on the market.

The White Lily Washer Company, Davenport, Iowa, have been incorporated with J. P. Schmidt as president; B. L. Schmidt, vice-president, and Samuel T. White, secretary and treasurer. The Schmidt Bros. have been for many years engaged in the manufacture of sash doors, prism and window glass and milko-rubber roofing at Davenport. Mr. White has been sales manager for the Voss Brothers Mfg. Company of Davenport. The company are now buying machinery and it is expected that the equipment will be installed early next month and that the new plant will be in active operation between December 15 and January 1.

The Wallace Supply Company, 56 Fifth avenue, Chicago, have extended the manufacturing department of their business by the recent purchase of a wood working plant at Somonauk, Ill. By the acquirement of this factory they are now prepared to manufacture various cabinet articles for office equipment and are prepared to negotiate contracts with outside concerns in reasonably large quantities. They have recently taken a contract for spice cabinets and some work is being executed on telephone boxes.

The Mandt Wagon Company, Moline, Ill., are at present equipping their entire plant at Stoughton, Wis., with the latest up to date sprinkling system, and have made other improvements in the way of putting in a full line of dust collectors, &c. They have also built a new dry house, 22 x 55 feet in size, two stories, and are now erecting a large spoke and felloe shed which will be iron covered and equipped with sprinklers.

The H. L. Hurst Mfg. Company of Canton, Ohio, have purchased an additional acre of ground centrally located and along the Pennsylvania system, and have already begun the erection of a modern factory building 40 x 100 feet. The structure will be entirely of brick and stone, two stories high, and lighted with over 70 large windows. Additional windows will be erected in the spring. This action was prompted because the present factory has become entirely inadequate for the production of their



increasing line of hardware specialties. The company will soon be in the market for presses and other sheet steel and iron working machinery for the new plant.

Stephenson Mfg. Company, South Bend, Ind., advise us that their capacity last year of about 8,000,000 turnings per month has been increased this year one-third. They state that during 1901 they made over 1,500,000 bent seat sticks for the buggy body manufacturers. The company have their own tool making department and give prompt estimates on small special fancy turnings in lots from 1000 to carloads, on receipt of samples or exact drawings.

#### Miscellaneous.

The Pittsburgh Filter Mfg. Company, Empire Building, Pittsburgh, Pa., have had an unusually busy year installing water works filters and water softening plants. Besides having constructed the largest water softening plant in the world, of 2,500,000 gallons, for the Tennessee Coal, Iron & Railway Company, Birmingham, Ala., they have installed the following additional plants: Colorado Fuel & Iron Company, Pueblo, Col., 7500 horse-power; Indianapolis Water Company, Indianapolis, Ind., 3000 horse-power; Cleveland Furnace Company, Cleveland, Ohio, 6000 horse-power; Morey-La Rue Laundry Company, Elizabeth, N. J., 1500 horse-power; Lafin & Rand Powder Company, Pompton Lakes, N. J., 1000 horse-power; Hidalgo Mining Company, Parrel, Mexico, 500 horse-power; Delaware, Lackawanna & Western Railway Company, Groveland and East Bethany, N. Y., each 300,000 gallons daily; Keokuk Cereal Company, Keokuk, Iowa, 600,000 gallons daily; Sharon Water Works Company, Sharon, Pa., 2,000,000 gallons daily; Waynesburg Water Company, Waynesburg, Pa., 1,000,000 gallons daily; Columbia Water Company, Columbia, Pa., 2,000,000 gallons daily; Upper Sandusky Water Company, Upper Sandusky, Ohio, 1,000,000 gallons daily, and United States Zinc Company, New York, 600,000 gallons daily.

The Marcus Hook Chemical Company, a new industry located at Marcus Hook, Pa., were chartered at Dover, Del., on Monday last, the capital stock being \$100,000. A. Jefferson Dunn is president and John Quayley the general superintendent. All the stock has been placed, the stockholders being Philadelphia and New York capitalists.

The Struthers Furnace Company, operating a blast furnace at Struthers, Ohio, will engage in the manufacture of cement from blast furnace slag and will erect a plant adjacent to the furnace, which will have a capacity of about 500 barrels per day. David Tod will be manager of the cement department.

The Leetsdale Drainage Company of Leetsdale, Pa., near Pittsburgh, have been organized by interests of the Ritter-Conley Mfg. Company of Pittsburgh. The latter have built a very large plant at Leetsdale for the building of steel barges and other steel structural work, which is partly in operation.

Walter Brown, secretary of the recently organized Elkhart Power & Paper Company, Elkhart, Ind., advises us that they do not know at present just what equipment will be required. The new company will take over a number of plants now in operation, and contemplate enlarging some of them.

The Walter A. Zelnicker Supply Company, St. Louis, Mo., carry in stock at their East St. Louis yards new rails from 8 to 35 pounds, which can be shipped immediately. They also issue a daily rail list showing the stocks in their yards at various points in this country.

The Virginia-Carolina Chemical Company, Richmond, Va., have purchased a site at Lynchburg where they will erect a new plant. The company will prepare their own plans and specifications and have already arranged for all the machinery and supplies that will be needed.

The Iron Hill Mining & Smelting Company of Steelville, Mo., recently incorporated, have organized by the election of A. L. Reeves, president; W. M. Durham, vice-president and manager, and Thos. R. Gibson, secretary and treasurer.

Ten furnaces at the new smelter of the Federal Lead Company at East Alton, Ill., were put into operation November 1. It is expected that the remainder of the plant will soon be called into action.

The Macomber & Whyte Rope Company, Chicago, with works at Coal City, Ill., advise us that the growth of business compels them to make another addition to their plant. Since the company began the manufacture of wire rope over a year ago they have doubled the size of their works and trebled their capacity. The capital stock of the company will be increased from \$60,000 to \$100,000 in the near future to enable further extension of business.

Pettibone, Mulliken & Co., manufacturers of frogs, crossings and switch material for steam railroads, have increased their capital stock from \$100,000—which was nominal—to \$2,750,000, divided into \$750,000 cumulative preferred and \$2,000,000 common. The increase in capital stock was for the purpose of capitalizing surplus and providing funds for the construction of a new plant. The company have purchased 30 acres of land at West Division street and the Chicago & Western Indiana tracks, where a large and complete plant will be constructed. Work is to be commenced immediately and will be pushed to completion as rapidly as possible. It is expected that the new works will be in opera-

tion by May 1, 1903. In the meantime the company will continue to operate the old plant, which is situated in the block bounded by Hawthorne avenue, Eastman, Dayton and Rees streets.

The Kinneear & Gager Company, Columbus, Ohio, manufacturers of metal ceilings, cornices, doors, &c., have purchased for \$30,000 the Gill plant of the American Can Company and will move their plant into the new quarters some time before January 1. Practically no new machinery will be required, as the present equipment is very complete. A 100 horse-power engine will be installed. The new works are 150 x 280 feet, and were only erected two years ago.

The Apollo Cement Mfg. Company have been organized at Pittsburgh with a capital of \$500,000. The new company propose to build early next year a modern cement plant near Apollo, Pa., with a daily capacity of 1000 barrels. Plans for the plant are being prepared by Armin Schotte, a mechanical engineer of Pittsburgh, who will be president of the company. J. H. Hendricks is secretary.

It is stated that the plant of the American Electric Vehicle Company in Hoboken, N. J., has been sold to George T. Lister, formerly vice-president and manager. The purchase price is \$15,000.

Westinghouse, Church, Kerr & Co., New York, report the following sales of Roney mechanical stokers for the past month: Carnegie Steel Company, Homestead Works, 12 duplex stokers, fifth order, total 15,000 horse-power; Juniata Steel & Iron Company, Greencastle, Ind., 10 duplex stokers; Lackawanna Steel Company, Buffalo, 16 duplex stokers, fourth order, 14,000 horse-power; Continental Tobacco Company, St. Louis, Mo., four duplex and one quadruplex stokers, third order; Atlanta Rolling Mill & Tinplate Company, Atlanta, Ind., eight duplex stokers; Woodward & Lothrop, Washington, D. C., six duplex stokers; Merchants' Heating & Light Company, Indianapolis, Ind., five duplex stokers. Duplex and quadruplex stokers are also installed in the J. L. Mott Iron Works, Trenton, N. J.; American Locomotive Works, Schenectady, N. Y., fourth order; Pennsylvania Railroad, Altoona, Pa., tenth order; U. S. Lighting & Power Company, Washington, D. C.; National Tube Company, Pittsburgh, Pa., sixth order; Pressed Steel Car Company, Pittsburgh, Pa., sixth order.

The Leckrone Coke Company, Uniontown, Pa., organized the middle of August, have about completed a plant near Leckrone and now have coke to offer to the trade. The quality of the coal and coke is as good as any made in the region, running very low in sulphur and phosphorus. Their property adjoins and the vein of coal is the same as that owned by the Frick Coke Company at their Leckrone works of the Southwest Connellsville Coke Company.

**Two New Blast Furnaces at Sharpville.**—The Shenango Furnace Company, Frick Building, Pittsburgh, are making plans for the building of two new blast furnaces at Sharpville, Pa., where the company now operate three Shenango stacks. It is the intention to remodel the present No. 3 Shenango stack and build two entirely new stacks, 80 x 20 or 85 x 21 feet in size. When these two new stacks have been completed the present Nos. 1 and 2 Shenango furnaces will be abandoned. The remodeled stack and the two new furnaces will have a daily capacity of about 1200 tons. The new furnaces will be equipped with Massicks & Crooke's hot blast stoves, of which George W. McClure, Son & Co., Smith Block, Pittsburgh, are sole builders in this country. Contracts for the balance of the equipment for the two new furnaces have not yet been let. It is expected to begin work about the first of the year.

F. G. Street, 36 La Salle street, Chicago, Ill., has been appointed sole agent for Northern Illinois, Indiana, Michigan, Minnesota, Wisconsin, North and South Dakota and Kansas, for the Scaife and We-Fu-Go water softening and purifying systems, manufactured by William B. Scaife & Sons Company, Pittsburgh, Pa.

The Lukens Iron & Steel Company, Coatesville, Pa., have been favored with the order for the steel plates to be used in building the new cup defender. These plates will be of nickel steel. The company have furnished nickel steel plates for four cup defenders in succession, also for the "Independence," Thomas W. Lawson's proposed cup defender, which was denied the privilege of serving in that capacity and was broken up soon after its completion. While the tonnage involved in these orders is not large, they constitute a high compliment to the Lukens Company for the quality and finish of their plates.

## The Iron and Metal Trades.

Conditions in the Iron industry have not changed materially during the past week, and it is yet too early to measure the effect of the election, which dispels all fears of any radical experiments. The Iron trade will therefore turn again to the study of the question whether present prices have or may curtail consumption. One point in connection with this should be emphasized more than it is, and that is that as yet the greatest tonnage of Foundry Iron which is being melted is at comparatively low prices, that a good deal of Steel which is being rolled is under sliding scale contracts costing much less than market prices, and that in the heavier rolled products the "official" prices apply, which are much lower than those which buyers must pay in the open market for prompt shipments. Indications that new work is being delayed on account of unduly high prices, which do crop up now and then, must therefore not be regarded as too significant.

The Coke situation is still very serious. Last Friday 18 furnaces in the Valleys and in the Pittsburgh district were banked. There seems little hope of such relief that the full tonnage of the furnaces will become available during the winter.

Furnace Coke has been selling at \$3.50 to \$4, by outside parties, for delivery during 1903, and contracts for Foundry Coke for the first half of 1903 have been closed at prices ranging between \$4.50 and \$5 at ovens.

Fancy prices for spot Foundry Pig Iron in the Central West have been giving way somewhat, and some Southern makers are taking orders at somewhat lower figures.

Few importation orders have been placed for Foundry Iron, but some business has been done in foreign special and Bessemer Pig.

The Steel market is quiet. Buyers are holding off about purchases of foreign Steel, partly on account of the uncertainty about the duty and partly because the lower prices on finished materials are making it difficult for some of the independent mills to compete.

Further orders have come to the Steel Rail makers, among them a few round lots of Nickel Steel Rails with 3 to 3½ per cent. of Nickel. Some large systems are still uncovered for next year. The present estimate of the tonnage which the mills will be forced to carry over into next year is about 325,000 tons.

Business in Structural Material is still coming forward, but in somewhat diminished volume. The banner branch of the industry is the Plate trade. Car builders have purchased very large quantities for next year, the last being a lot of 18,000 tons at 1.60c.

In the aggregate the car works have taken from 50,000 to 60,000 tons in the last ten days. Besides this a good deal of tonnage for shipbuilding is pending.

The leading interest in the Tube industry has not, as reported, announced lower prices to the trade, but it is expected that a revised list will be issued before long.

In the Sheet trade some cutting of prices is going on, and in the Bar industry values are not as firm as they were, although a fair amount of tonnage is reported.

The reduction in the price of Tin Plate of 40 cents per box was somewhat of a surprise, so far as the amount was concerned. That a revision of values was coming was pretty generally accepted as inevitable.

## A Comparison of Prices.

Advances Over the Previous Month in Heavy Type.  
Declines in Italics.

At date, one month and one year previous.

	Nov. 5, 1902.	Oct. 29, 1902.	Oct. 8, 1902.	Nov. 6, 1901.
<b>PIG IRON:</b>				
Foundry Pig No. 2, Standard, Philadelphia .....	*\$22.50	*\$22.50	*\$22.00	\$15.25
Foundry Pig No. 2, Southern, Cincinnati .....	*22.25	*22.25	*22.25	13.75
Foundry Pig No. 2, Local, Chicago .....	*23.00	*23.00	*23.00	14.75
Bessemer Pig, Pittsburgh .....	*21.50	*21.75	*21.75	16.00
Gray Forge, Pittsburgh .....	*21.50	*21.75	*20.50	14.10
Lake Superior Charcoal, Chicago .....	*26.00	*26.00	*26.00	17.00
<b>BILLETS, RAILS, ETC.:</b>				
Steel Billets, Pittsburgh .....	29.00	29.50	†29.00	27.00
Steel Billets, Philadelphia .....	†27.00	†27.50	†27.00	28.00
Steel Billets, Chicago .....	†29.00	†29.00	†30.00	....
Wire Rods, Pittsburgh .....	35.50	36.00	35.50	35.00
Steel Rails, Heavy, Eastern Mill .....	28.00	28.00	28.00	28.00
<b>OLD MATERIAL:</b>				
O. Steel Rails, Chicago .....	19.00	19.00	19.00	14.00
O. Steel Rails, Philadelphia .....	21.50	21.50	21.50	17.00
O. Iron Rails, Chicago .....	25.00	25.00	25.00	21.00
O. Iron Rails, Philadelphia .....	24.50	24.50	25.00	21.00
O. Car Wheels, Chicago .....	24.00	24.00	22.50	16.00
O. Car Wheels, Philadelphia .....	21.00	19.00	19.50	16.00
Heavy Steel Scrap, Pittsburgh .....	21.00	....	....	....
Heavy Steel Scrap, Chicago .....	18.50	18.50	18.50	13.50
<b>FINISHED IRON AND STEEL:</b>				
Refined Iron Bars, Philadelphia .....	1.35	1.92	1.92½	1.65
Common Iron Bars, Chicago .....	1.75	1.80	1.80	1.70
Common Iron Bars, Pittsburgh .....	1.80	1.80	1.80	1.60
Steel Bars, Tidewater .....	1.72	1.75	1.80	1.62½
Steel Bars, Pittsburgh .....	1.60	1.60	1.60	1.50
Tank Plates, Tidewater .....	2.10	2.10	2.00	1.75
Tank Plates, Pittsburgh .....	1.85	1.90	1.75	1.60
Beams, Tidewater .....	2.00	2.00	2.10	1.75
Beams, Pittsburgh .....	2.10	2.10	Nom.	1.60
Angles, Tidewater .....	2.00	2.00	2.10	1.75
Angles, Pittsburgh .....	2.00	2.00	Nom.	1.60
Skelp, Grooved Iron, Pittsburgh .....	1.95	1.95	2.00	1.80
Skelp, Sheared Iron, Pittsburgh .....	2.05	2.05	2.10	1.85
Sheets, No. 27, Pittsburgh .....	2.65	2.65	2.65	3.00
Barb Wire, f.o.b. Pittsburgh .....	2.45	2.45	2.50	2.90
Wire Nails, f.o.b. Pittsburgh .....	1.85	1.85	1.90	2.20
Cut Nails, Mill .....	2.05	2.05	2.05	2.05
<b>METALS:</b>				
Copper, New York .....	11.62½	11.75	11.55	16.85
Spelter, St. Louis .....	5.15	5.20	5.25	4.12½
Lead, New York .....	4.10	4.10	4.10	4.37½
Lead, St. Louis .....	4.00	4.00	4.00	4.25
Tin, New York .....	26.12½	26.75	25.00	24.60
Antimony, Hallett, New York .....	7.75	7.75	7.75	8.37½
Nickel, New York .....	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York .....	3.79	4.19	4.19	4.19

\* For 1903. † Foreign.

## Chicago.

FISHER BUILDING, November 5, 1902.—(By Telegraph.)

For the moment interest centers largely in the destiny of the Coke industry. The attitude taken by the Frick Coke Company in regard to prices, contracts and agencies has precipitated a crisis and has resulted in the purchase of Coal lands and the projecting of various enterprises for constructing ovens in various parts of the country, wherever Coking Coal is available. Merchant furnaces, their agents and foundries are all anxious to know the position they are in for next year's supply of fuel, and the management of ovens other than the Frick interests are said to have advanced prices materially for contracts covering the year 1903. The prospects seem to be favorable for greater activity in the Coke and Coal field than ever before. In Pig Iron, aside from the interest in fuel, the suspicion conserved by some large consumers that some Southern furnaces are morally delinquent has been the most prominent development. There has been a further slight weakening in Bar Iron, and Steel Bars have not revived to any appreciable extent, except at the close some liberal contracts have been specified upon by agricultural implement manufacturers. In Structural business has been confined largely to movement from local stocks, the urgent demand for next year's delivery seeming to have spent its force. Further weakness has been developed in Billets, both foreign and domestic, and some independent mills have made further reductions in prices of Light Sheets. Merchant Pipe has continued quiet, but Boiler Tubes have gathered a firmer tone. Merchant Steel has been quiet, but this lull is rather welcomed by the mills than otherwise. Even Rails and Plates have shown



less activity, but some large contracts for Rails for next year's delivery are still pending, the time of making the deliveries being the only drawback to closing. Old Material has shown a little weakening in such kinds as are consumed principally by Bar Iron mills, but otherwise there has been but little change in the market.

**Pig Iron.**—The Coke supply, both present and prospective, is the principal factor upon which prices of Pig Iron for the moment depend more than upon anything else. Should transportation facilities prove ample to move Coke with the dispatch and in the quantity required by furnaces the opinion prevails that prices for Iron for this year and for next year's delivery will be adjusted by a decline for the near months; otherwise the present high prices which are prevailing for spot, November and December delivery will be more nearly maintained during the early months of next year. For the time being furnaces and dealers are able to obtain prices for small quantities, ranging from single cars to 100-ton lots, out of all proportion to the prices current under normal conditions, and these prices are maintained only by the demand from consumers to meet necessities made by the non-delivery of supplies already purchased. But the facility with which spot Iron is apparently available has led to the suspicion that some furnaces are taking advantage of conditions to obtain the high premiums being paid on Iron for quick delivery, failing to make deliveries on old contracts at stipulated time, the greater profits being too seductive for some producers. Some large consumers taking this view of the matter have brought great pressure to bear upon delinquent furnaces, and where they have not compelled deliveries they have demanded purchases in the open market and protection from loss by such acquisitions. In this process the innocent have suffered with the guilty, and the demand for the fulfillment of contracts to the letter has resulted in some shifting and swapping of different grades of Iron. The prices resulting from such transactions have been irregular and, of course, do not furnish a criterion for other sales. It is difficult, if not impossible, to determine what furnaces and companies, if any, are morally delinquent, but if such practices have really been indulged in they will be no longer safe under the present attitude of consumers, who are fully convinced that the high prices for spot delivery are made possible only by the reselling of capacity already contracted for at much lower prices. Single car lots of Southern No. 2 Foundry have been sold mainly at \$27.15, although much higher prices are not infrequent. It should be remembered, however, that such prices prevail only for relatively small amounts, and if reports prove correct that consumers are receiving Iron in more ample supply for current wants, the extreme prices will lack the support of the urgent demand which they have had heretofore. For November and December, 1902, delivery there have been two sales of 1000-ton lots of No. 2 Southern Foundry, ranging from \$26.15 to \$26.65, and a few 100-ton lots for the first six months' delivery of next year on the basis of \$24.15, Chicago. There is very little buying, however, for any months of next year's delivery, although one transaction of 850 tons of No. 2 Foundry is reported at prices ranging from \$18 to \$18.50 at the furnace, Birmingham, for delivery extending from May to September, 1903. There have continued to be sales of car lots of Silvery Iron at \$29.15 to \$31.15, according to percentage of silicon, for prompt shipment, and several 100-ton lots of Standard Bessemer at prices ranging from \$24.95 to \$25.45. Malleable Bessemer has also been sold in moderate amounts, ranging from \$25.50 to \$26 for early shipment. Small lots of No. 2 foreign Iron have been sold at about \$27 spot and \$26 for December and January delivery, but cargo lots, it should be remembered, are obtainable at much lower prices. There is scarcely enough trading to accurately determine prices current for the first six months of next year, but there seems to be nothing to warrant a revision of the prices previously quoted, which are for delivery during the first half of 1903. We quote:

Lake Superior Charcoal.....	\$26.00 to \$27.00
Local Coke Foundry, No. 1.....	23.50 to 24.00
Local Coke Foundry, No. 2.....	23.00 to 23.50
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	24.00 to 24.50
Ohio Strong Softeners, No. 1.....	25.50 to 26.00
Southern Silvery, according to Silicon.....	24.10 to 24.50
Southern Coke, No. 1.....	24.15 to 24.65
Southern Coke, No. 2.....	23.65 to 24.15
Southern Coke, No. 3.....	23.15 to 23.65
Southern Coke, No. 1 Soft.....	24.15 to 24.65
Southern Coke, No. 2 Soft.....	23.65 to 24.15
Foundry Forge.....	22.15 to 22.65
Southern Gray Forge.....	21.65 to 22.15
Southern Mottled.....	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon.....	27.15 to 27.65
Alabama and Georgia Car Wheel.....	27.00 to 27.50
Malleable Bessemer.....	23.50 to 24.00
Standard Bessemer.....	23.00 to 23.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	27.60 to 28.60

**Bars.**—There has been no improvement in the market for Bar Iron. The demand has been light and the offerings freer. It is difficult to make contracts for appreciable amounts over 1.75c., but some business has been transacted

at between 1.75c. and 1.80c. and single cars have been sold at 1.85c., Chicago, mill shipment. The demand for Soft Steel Bars also is light, there being very little new business in sight and specifying on contracts rather discouraging than otherwise to the mills, but at the close some Agricultural Implement manufacturers here specified more liberally. There is a moderate demand only for Hoops and Small Angles continue slow. The following are the prices current: Soft Steel Bars, 1.75c. to 1.85c.; Hoops, 2.15c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipment. The store trade has been light and prices have been without essential change. Bar Iron is selling at 2.15c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.40c. to 2.50c. from store.

**Structural Material.**—Very few contracts for next year's delivery are offering, but the capacity of the mills for large sizes is sold ahead for many months. Smaller sizes, of course, are obtainable within a few weeks' time. Contracts for local buildings calling for about 6000 tons were placed during the week, but will all be supplied from local stocks or by direct shipments from the mills, but these contracts were virtually covered some time since, only a few hundred tons probably being actually new business. There has been little call for foreign material, and prices are entirely nominal. For domestic Steel, mill shipment, prices are as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. Local stocks are now quite full, and prompt deliveries can be made on all but the very large sizes, which continue scarce. The following are the prices current: Beams and Channels at 2.50c. to 3c., Angles at 2.50c. to 3c. and Tees at 2.55c. to 3.50c., at local yards.

**Plates.**—There continues to be a liberal volume of business, although there is less demand for mill shipment, mills being crowded with old contracts. The following are the prices current, mill shipment: Tank Steel, ¼ inch and heavier, 1.75c. to 2c.; Flange, 1.85c. to 2.10c.; Marine, 1.95c. to 2.20c. The movement from local yards continues to increase, the demand being still active. The following are the prices obtained: Tank Steel, ¼ inch and heavier, 2.25c. to 2.50c.; Tank Steel, No. 8, 2.35c. to 2.55c.; Flange, 2.45c. to 2.65c., all f.o.b. warehouse, Chicago.

**Sheets.**—The situation has not changed for the better, at least so far as prices are concerned, keen competition still resulting in lower prices in some instances, a few of the smaller independent mills making lower prices than have heretofore ruled. However, these have not been met generally by other mills. Galvanized continues especially weak, and is offered at 75 and 10 per cent. discount on the base price f.o.b. mill. The jobbing demand has continued fair and readily met at the following prices: No. 20 Black Sheets sell at 2.55c. to 2.65c., No. 27 at 2.80c. to 2.90c., mill shipment. Small lots from store at 3c. to 3.10c., Chicago. Galvanized Sheets are sold at 3.25c. to 3.50c., net, mill shipment, while small lots are sold at 3.40c. to 3.65c. from store for No. 27.

**Cast Pipe.**—The market has continued very quiet, there being few if any large contracts offering, as usual at this season of the year, but there continues to be a fair amount of small orders, mainly for sizes ranging from 4 to 8 inches, for which prices have remained steady. Manufacturers continue to sell small lots as follows: 4-inch, \$37; 6-inch, \$36; 8-inch and upward, \$35; Gas Pipe, \$1 per ton higher, all f.o.b. Chicago.

**Billets.**—There have been freer offerings of both domestic and foreign Billets, and the market is probably about \$1 per ton lower, but there is scarcely enough trading to establish prices on round lots. Domestic Open Hearth Forging Billets are selling in a small way at prices ranging from \$35 to \$40, according to analysis, buyer and time of delivery; but Re-rolling Billets would be difficult to sell at over \$31 to \$32. Foreign Billets are quotable at \$29 to \$30, delivered, Chicago, duty paid, and sales were made on the Eastern seaboard at \$27.25, c.i.f.

**Merchant Pipe.**—The market has continued quiet, with an easy tone prevailing incidental to keen competition. The following are the nominal prices, random lengths, Chicago, subject to a discount of 10 and 5: Black, ½ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ½ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off. Some manufacturers are making the following prices for mill shipment, Chicago, random lengths, subject to a discount of 10 and 10: Black, ½ to ½ inch, 58½ off; ¾ to 12 inches, 65½ off; Galvanized, ½ to ½ inch, 46½ off; ¾ to 12 inches, 54½ off.

**Boiler Tubes.**—Since the advance of 2½ per cent. on Charcoal Iron Tubes the market has steadied somewhat for both Iron and Steel, there being less disposition to grant increased discounts. There continues to be a fair volume of business at the following prices, subject to an additional discount of 5 per cent. over the schedule for mill shipment:

	Steel.	Iron.
1 to 1½ inches.....	43½	38
1½ to 2½ inches.....	56	36
2½ to 5 inches.....	61	46
6 inches and larger.....	56	36

There has continued to be a fair demand for small lots from

store, and prices have been subject to less variation. The schedule of discounts remains as follows:

1 to 1½ inches.....	35	35
1½ to 2½ inches.....	47½	32½
2½ to 5 inches.....	55	42½
6 inches and larger.....	47½	

**Merchant Steel.**—There has been less demand for various kinds of Steel, but there has been some little increase in the specifications received from agricultural implement manufacturers. There is still much difficulty encountered in making shipments from the mills, which are still accumulating stock. There is a fair store trade for Tool Steel, but prices are without essential change. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 7c. for mill shipment; specials, 12c. upward.

**Rails and Track Supplies.**—There has been a sudden cessation in the demand for Heavy Rails for next year's delivery, but there are still urgent inquiries for moderate amounts for this year, which it is almost impossible to cover. Several large contracts for next year's delivery are still pending, and one order for 50,000 tons of foreign Rails, American Sections, is reported to have been placed in New York on Tuesday. There are freer offerings of foreign Steel for delivery during the next 60 or 90 days. The demand for Relaying Rails continues active, but they are very scarce. Light Rails are selling readily in small quantities at full prices. Official prices for domestic Rails continue unchanged, at \$28 for standard and \$27 for second quality, mill shipment. Angle Bars and other Track Supplies are active and firm. The following are the prices current: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

**Old Materials.**—Bar Iron mills are curtailing production, as orders for Bars are light, and specifying on old contracts shows little improvement. As a result the market for Tubings, Borings and Busheling Scrap is easier, but there continues to be a good demand for other grades from Open Hearth furnaces and foundries, which are melting Scrap with High Silicon Iron to a greater extent than has been known for many years. Relaying Rails and Car Wheels continue very scarce and are wanted, with prices little better than nominal in the absence of trading in appreciable amounts. The following are the prices per gross ton, Chicago:

Old Iron Rails.....	\$25.00 to \$25.25
Old Steel Rails, mixed lengths.....	19.00 to 19.25
Old Steel Rails, long lengths.....	23.50 to 24.50
Heavy Relaying Rails.....	32.00 to 32.50
Old Car Wheels.....	24.00 to 25.00
Heavy Melting Steel Scrap.....	18.50 to 18.75
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$22.50 to \$22.75
Iron Car Axles.....	23.50 to 25.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	21.25 to 21.75
No. 2 Railroad Wrought.....	18.50 to 19.00
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	17.00 to 17.50
No. 1 Busheling and Wrought Pipe.....	15.00 to 15.50
Iron Axle Turnings.....	15.00 to 15.50
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.00 to 14.50
Cast Borings.....	10.25 to 10.75
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Bollers, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	17.00 to 17.50
Stove Plate and Light Cast Scrap.....	13.50 to 14.00
Railroad Malleable.....	16.25 to 16.75
Agricultural Malleable.....	16.00 to 16.25

**Metals.**—Copper has been somewhat firmer in tone, but there has been little increase in the volume of business. Lake is quotable at 11½c. to 12c. in carload lots; 12½c. to 12¾c. in a jobbing way. Pig Lead has continued to sell well at 4.05c. in 50-ton lots, 4.07½c. for carload lots and 4.10c. in a jobbing way. Sheet Zinc has been in fair demand and steady, at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have been moderately active and Copper and Zinc a little stronger in tone. The following are the prices current: Heavy Cut Copper, 10½c.; Red Brass, 10½c.; Copper Bottoms, 9½c.; Lead Pipe, 3.90c.; Zinc, 3.95c.

**Coke.**—The market has been somewhat irregular and unsettled, although there have been more ample receipts of Furnace grades. The supply has been intermittent. Sales of Virginia Coke have been made at prices ranging from \$12 to \$14 per ton, the outside price being for single car lots for foundry purposes. Since the establishment of the \$3 rate at the ovens for 1903 by the Frick Coke Company the independent ovens have developed a stronger tone, and are now demanding from \$4.50 to \$5 per ton for contracts covering a year's supply, it being understood that very little, if any, of the Frick Coke will be available for merchant furnaces or foundries in this locality.

## Philadelphia.

FORREST BUILDING, November 3, 1902.

At the moment it would be difficult to write a report of the Iron market which might not require revision after the election, so that attempts at forecasts will be left in abeyance. The immediate situation, therefore, may be summarized in a few words, and those uttered by the immortal Micawber are as fitting as any—"waiting for something to turn up." The past week has not been specially eventful and on the whole not particularly encouraging. Reports from the West are bullish in raw materials, but there are distinct evidences of weakness in Finished Material emanating from Western sources, so that Eastern markets are, to say the least, irregular, with a slight downward tendency in everything except Plates, which are particularly strong. Pig Iron brings very extreme prices for spot lots of American and is also fairly strong for Scotch, but for later delivery the feeling is neither strong nor weak, simply indifferent. The talk of immediate resumption of work at some of the furnaces in this territory leads to the postponement of purchases temporarily, and whether well founded or not, buyers think they will be able to do better after a while, so that for the present all they care about is to get just enough Iron to keep them moving. This can be done at from \$23.50 to \$24.50 for good No. 2 X Foundry or for good Scotch Iron, and at a little less than last week's quotations for all grades and all deliveries during 1903. The elections and the possibility of larger supplies of Pig Iron are the controlling influences, although it is by no means certain that these expectations will be realized, but a few days more will probably throw enough light on the situation to warrant some sort of a decision being made.

Plates are very strong, with sales of 1000-ton lots at 2c. at mill, and more business offering than can be expected. Bars, however, are somewhat easier and business can be done at 1.85c. to 1.90c. for carload lots of Refined Iron and Steel at 1.72c. to 1.80c. Structural Material is easier and for large lots may be quoted at 1.75c. for Angles and 1.85c. to 2c. for Beams and Channels.

The Eastern Steel Company will commence rolling Shapes next week and are entering orders at their Philadelphia office in the Girard Building. Billets are unsettled, but bids of \$27 have been asked for by the agents of foreign houses, with intimations that business is wanted and would be accepted on terms favorable to the buyer. American Steel brings \$31.50 to \$33 for prompt shipments, nothing doing for late deliveries. Old Material is unchanged except Car Wheels, which are dearer and would bring \$21 to \$21.50. Borings also bring more money, as there is a big demand from Western buyers.

## Cincinnati.

FIFTH AND MAIN STS., November 4, 1902.—(By Telegraph.)

The only change of consequence in the Pig Iron market is a noticeable tendency to irregularity in ideas as to values. This is caused in part beyond doubt by the fact that spot Iron so far as Southern grades go is much more freely offered and the buyers appear lacking. As a consequence prices from many sources have eased off a little. Two weeks ago \$23, Birmingham basis, was the minimum price on No. 2 Foundry for spot delivery. Last week this had declined 50c. per ton. To-day the same grade is offered on the basis of \$21. It is true that there are some sellers who report sales on a higher basis and who say they know nothing of any lower figures than the ones current two weeks ago. A sale of No. 1 Foundry on the basis of \$24, Birmingham, for spot shipment is reported as made within a week. Five hundred tons of No. 4 Foundry for prompt shipment on the basis of \$15.75, Birmingham, is also quoted. Prices for first half of 1903 have not changed, though the offerings are more liberal as well. Several furnaces have announced themselves as prepared to open their books for last half deliveries. Their ideas vary materially, however. One is known to have instructed the agents here to sell at \$18, another names \$19 and a third \$20, Birmingham basis, for No. 2 Foundry. These furnaces are among those quoted as in the agreement to maintain a uniform price. The situation is not regarded as weak and no great decline in Iron is predicted, though there is a well defined expectation among some sellers of a lower general basis than what has been prevailing. Freight rate from the Hanging Rock district is \$1.10, and from Birmingham to Ohio River points \$3.25. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1.....	\$25.00 to \$26.00
Southern Coke, No. 2.....	24.00 to 25.00
Southern Coke, No. 3.....	23.00 to 24.50
Southern Coke, No. 4.....	19.00 to 20.00
Southern Coke, No. 1 Soft.....	25.00 to 26.00
Southern Coke, No. 2 Soft.....	24.00 to 25.00
Southern Coke, Gray Forge.....	19.00 to 20.00
Southern Coke, Mottled.....	19.00 to 20.00
Ohio Silvery, No. 1.....	30.10 to 32.10
Lake Superior Coke, No. 1.....	26.10 to 26.60
Lake Superior Coke, No. 2.....	25.60 to 26.10
Lake Superior Coke, No. 3.....	25.10 to 25.60



*Car Wheel and Malleable Irons.*

Standard Southern Car Wheel.....\$28.25 to \$29.25  
 Lake Superior Car Wheel and Malleable 27.50 to 28.50

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No. 1.....	\$22.75 to \$24.00
Southern Coke, No. 2.....	22.25 to 23.25
Southern Coke, No. 3.....	21.75 to 22.75
Southern Coke, No. 4.....	21.25 to 22.25
Southern Coke, Gray Forge.....	21.25 to 22.25
Southern Coke, Mottled.....	21.25 to 22.25
Southern Coke, No. 1 Soft.....	22.75 to 24.00
Southern Coke, No. 2 Soft.....	22.25 to 23.25
Lake Superior Coke, No. 1.....	26.60 to 27.10
Lake Superior Coke, No. 2.....	25.60 to 26.10

In reference to the quotations for 1903 it must be understood that the minimum figures for Southern Irons are applicable to Virginia brands, and the maximum solely to the Tennessee and Alabama product.

**Old Material.**—We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$21 per net ton; Cast Scrap, \$18 per gross ton; Iron Rails, \$24.50 to \$25, gross; Steel Rails, long, \$24 to \$24.50, gross; Steel Rails, short, \$18.50 to \$19, gross; Iron Axles, \$27.75 to \$28.25, net; Car Wheels, \$21 to \$21.50, gross.

**Plates and Bars.**—The market is not so strong, though the prices are nominally unchanged. Iron Bars in carload lots, 1.92c., with half extras; same, small lots, 2.20c., full extras; Steel Bars, carload lots, 1.72c., with half extras; same, small lots, 2.20c., full extras. Plates are quoted nominally, 1/4-inch, in carloads, 1.70c.; same, 3-16, 1.80c. As a matter of fact, however, mills having Plates to ship are getting 2.15c. without trouble. I-Beams and Channels, 1.70c., base. All prices f.o.b. Cincinnati.

**Cleveland.**

CLEVELAND, OHIO, November 4, 1902.

**Iron Ore.**—Rate matters in the Iron Ore market during the past week have taken on added interest because of certain increases demanded by the vessel owners. The Escanaba rate has been advanced to 65c. to Ohio ports, while some of the shippers sending material to Buffalo furnaces have been compelled to pay 75c. The differential is, however, probably greater than the occasion warrants, and it seems as if a reduction in the Buffalo rate may be made with the next chartering rather than an increase in the rates to Ohio ports, which some of the vesselmen have been demanding. In all respects this is a shippers' market. The reason for the stability of the Escanaba rate against the united demand of the vessel interests is the stand taken by the United States Steel Corporation backed by all of the larger shippers on the lakes. The Steel Corporation have the fleet to back up their demands on the vessel interests and have now fully determined to retain all of their boats in service during the remainder of the season rather than pay the higher rates on Ore. The same company have granted a 5c. increase on all ports saying that this covers the increased expenditure for the vessel owners brought about by higher wages, higher fuel and provision bills and the like. Some few charters have been made at higher figures, but in most instances there has been a string to each one of them. For instance, a Duluth charter was made a few days ago at 95c. to Detroit, but this was to cover a small block of three cargoes of Ore going to an out of the way dock. Other charters of like nature have given a tone to the market which is not warranted, most owners being satisfied with the old rates of 80c. from Duluth, 70c. from Marquette and 60c. to 65c. from Escanaba.

**Pig Iron.**—The continued banking of furnaces has created conditions which are discussed to the exclusion of every other topic. The furnaces which were out of blast a week ago continued so until Monday of this week, when one or two of them went back, with prospects of continuing active for six or seven days. Other furnaces, however, which have been active are again in idleness, the four furnaces of the Republic Iron & Steel Company at Youngstown having been added to the list but recently. Coke deliveries have been the troublesome feature. The reports are that there is plenty of Coke at the ovens, but the furnaces cannot get hold of it because the railroads cannot move it. This brings out a situation which is rather difficult to explain. The furnaces owned by the Steel Corporation and furnished Coke by the Frick Coke Company seem to have an adequate supply for their immediate needs, while the independent furnaces obtaining their supply from the same source usually now find themselves unable to obtain deliveries in sufficient quantities to keep them going. The affair can hardly be considered a railroad demonstration against the independent furnaces, since those of this territory who buy from the Raney ovens have been getting fair deliveries if they have been regular customers. The month of September was one of remarkable conditions, because the furnaces were banked during ten days out of the 30. It is now found that many of them in this vicinity have been able to run only ten days out of the 31

in October. This condition is almost general with those furnaces which have been annoyed by the intermittent supply of Coke during the last few months. In this respect it is apparent that for Pig Iron production the month of October was by no means a healthy one, but rather such a month as will by and by give the producers a great and heroic task to perform in meeting their contracts anywhere near on time. Some relief from the present Coke stringency may be felt within the month or as soon as the season of navigation is over. Such a condition of the Coke market and the operation of furnaces being considered, spot Iron or further contract Iron for delivery until the present contracts have been filled is entirely out of the question. In most instances the furnaces will be tied up until July 1, whereas now they ought to finish with the month of March. The furnaces which have sold three-quarters of their possible output as far ahead as the middle of June or July 1 are now likely to suffer very seriously from the results of this shortage of raw material, as it means that it will take them fully two months to catch up. If there is a furnace in this territory which has now any Iron for sale during the first half of the year it has not yet made any such statement where the consumers have heard of it. The only possible relief will come from the new furnaces which are going into blast, and which have as yet taken no orders against their output. For the remainder of it the foreign producers will provide. The foreign producers now have the call on all orders from the consumers of this territory for spot delivery. The shipments which have been made of late have proved satisfactory in a sense, and the foundries can make shift with what they have been able to obtain. It cannot be learned that any new orders abroad have been placed of late, but shipments on the old orders have been brisk. Consumers are even beginning to inquire abroad for material which they will use after the first of next year, being unable to obtain what they desire at home. The demand for Foundry Iron in this territory is likely to decrease temporarily for the present, due to a strike of the bench molders, who have been desiring a recognition of the union. For No. 2 Foundry, Valley furnace, \$23 is quoted for first half delivery and from Southern furnaces \$20, Birmingham; for second half delivery \$21 for No. 2, Valley furnace, and \$18.50 to \$21, Birmingham, for Southern Iron; Scotch No. 1 is bringing \$25.50 delivered and Nova Scotia \$23.50; Bessemer is \$23 for first and \$21 for second half delivery, and Basic is ranging between \$20.50 to \$21.50, Valley furnace, for both first and second half delivery.

**Finished Iron and Steel.**—The principal point of interest in the Iron and Steel trade in this vicinity during the week was the strengthening of the Bar Iron market and a better tone generally in Iron products. At the same time all of the heavier grades began to show signs of new strength, and the uncertainty which has hung over the whole market during the past five or six weeks seems to have been dispelled entirely. Out of it has come a better demand for Plates, which has taken up the capacity for a long time ahead; a better inquiry for Structural Steel; more Rail orders, and a general run of good business. The increased demand for Bar Iron, however, has put that market squarely on its feet again. Some time ago there was a variety of quotations, and none of them being upheld when a good market was afforded for a certain grade of material. As late as last week Youngstown and Pittsburgh were used optionally for basing purposes on prices, but this week all of the mills producing Bar Iron have come out on a basis where 1.80c., Pittsburgh, is universally quoted and is lived up to. The situation is such that orders in prospect are being anticipated. The entire output for the remainder of this year has been sold and some inquiries are placed for material past January 1. Bar Steel prices are also holding up well, and old orders are being shipped, while new ones are coming in for material after January 1, there being no material for sale before that time. The substitution of Bessemer Bars for Bessemer Billets has been continued to some extent, although, the Bar supply falling short and the Billet supply increasing some, this is not now being done as generally as was the practice a short time ago. Bessemer Bar Steel is now quoted at 1.60c., Pittsburgh, and Open Hearth at 1.70c., Pittsburgh. The Plate demand is truly phenomenal. This material is now the leader in the market as distinctly as it was during the summer of 1900, and while the supply for this year and for the first half of next year have been sold up, the sales have not stopped, and it is now said that the Steel Corporation mills are sold up for a year ahead. These sales have all been made at the old association prices, and the selling into the latter half of next year is a further establishment of the price policy of the Steel Corporation and also an indication that the concern have some assurance that Bessemer Pig Iron prices are not to be as exorbitant as some are now inclined to believe. While this material has been sold that far ahead, there is still a certain element in the market whose needs have not been covered. These are forced to go to the smaller mills for their material and are paying large premiums. The smaller mills have lately refused to take any orders ahead and are selling now only for practically short delivery, desiring to have their capacity clear to take any advantage of any possible change in the

market. The jobbers have about sold out their supply of Plates for the first half of next year, as well as for this year's delivery. Prices continue as follows: From mills for spot delivery, 2c. to 2.10c.; out of stock, for both Universal and Sheared Plates, 2.50c., and from the standard mills, for future delivery, 1.60c. The demand for Structural Shapes has also been heavy during the last week. The buying of larger consumers has not yet exhausted the available supply for the first half of the year, although it is confessed that there is no very large quantity yet for sale. No buying has been done for the third quarter delivery of next year. The jobbers and the smaller mills are still selling at a premium in this territory for early delivery. On such sales the price obtained has been 2.50c. to 3c. out of stock and 2.60c. from the mill. It is still to be reported that the Sheet market is weak, having caught none of that rejuvenation which came to the other lines of trade during the past week. The market has been off for some time, but it seemed for a while that the reduction in prices had brought about permanent relief to the mills; but this is not the case. Prices have continued as they were quoted last, at 2.85c. to 2.95c. for Black Sheets at the mill for No. 27 as a base in carload lots, 3.10c. to 3.25c. for the same gauge out of stock, and 3.70c. to 3.85c. for Galvanized Sheets. This week a reduction was also made in the price of the principal gauges of Merchant Pipe, and it was argued from this that a general weakness was noticeable in the Steel trade generally. Other conditions disproved such an assertion and besides it is known that the Steel Corporation are preparing to preserve to themselves the Steel market on Merchant Pipe. There has been a good demand for Bessemer Billets and a few sales have been made, but the larger companies do not indicate that they have any very large capacity which is not covered either for their own use or by contracts. The price is now quoted at \$30 for immediate shipment. This week a sale of 1000 tons of Bessemer Slabs was made at a price ranging about \$29.50 at the mill, and will be delivered here at Cleveland.

**Old Material.**—The market this week has been steady but without any sales of importance having been made. The price of Cast Scrap took another jump this week, and together with the Mill Scrap is about to the point now where the consumers cannot use it to any profit. Quotations are revised as follows: No. 1 Wrought, \$21, net; Iron Rails, \$27.50, gross; Iron Axles, \$28, net; Cast Borings, \$12, gross; Wrought Turnings, \$16.50, gross; Cast Scrap, \$19, net; Car Wheels, \$19, gross; Heavy Melting Steel, \$19, gross; Old Steel Rails, \$20, gross.

## Birmingham.

BIRMINGHAM, ALA., November 3, 1902.

A recapitulation of last week's report with the added statement that there was an increased demand tells the condition of the market for this week. The monotony of the market was varied by the advent of some large buyers, and their appearance had a tendency to keep prices firm. The larger buyers have been letting the market alone. Coming in now is tantamount to saying we must have some Iron even at prices we condemn. They are not after the long deferred options, but are after the short delivery options, and when they can get them they take them. Of this character of business the inquiries are fully for 50,000 tons, and this is a material increase over what has lately prevailed. Price is no deterrent so far, and there is no difficulty in placing Iron for spot or nearby deliveries, and the demand about covers all the grades.

Some No. 2 Foundry sold at \$24 for November delivery, and compared with late transactions it was a round lot. Some of the same grade sold for December delivery at \$23, and that was also a round lot. Some Charcoal Iron also was sold, and that went at \$26. It may tax the credulity of some buyers to state it, but it is, nevertheless, a fact that No. 3 Foundry sold at equal to \$23.25 here; the Iron going from a point north of us. This lot was immediate shipment. That same grade the balance of this year is about \$20. Some Mottled Iron sold at \$16. It was a small lot. Gray Forge is still variable in price, being quoted all the way from \$17 to \$19, with no sales reported. When you go into next year you will find the same variation in price, particularly for the first quarter. It is conservative to quote the market for that delivery on the basis of \$22 to \$22.50 for No. 2 Foundry. There were sales at both these prices, and the buyers were big guns in the trade.

Spot and nearby delivery Iron is holding its own. There were sales of No. 2 Foundry at \$25 and some at \$24. A small lot of Silver Gray went at \$26. There was more activity and a little more Iron on the market than has been the case of late. All that was sold was not Birmingham make. The Scotch Pig recently imported is being placed, No. 2 bringing \$24. The furnaces are turning out a little more Iron, but it will be surprising if it continues for any length of time. The fine weather we have had has been a great factor in favor of production. With that in their favor the furnaces could not run full time, and in several instances there has been a shutting down because of shortage in sup-

plies. If that was the case under such conditions will they not be aggravated as we get into winter and have the never failing delays that season always brings? We are doing just as well now as we will be able to do until spring comes, and only disappointment can come to him who anticipates any material improvement of this condition.

The situation in regard to Coke does not improve. A few are fairly well supplied, but the majority are put to it to keep their furnaces in blast, and, as stated above, more than one furnace has had to shut down because of failure of Coke supply. This has been the case particularly with the interests that depended on outside Coke to feed their furnaces. They could not supply their deficiency from any other source. The result is that the price of Coke is well maintained. Sales were made at \$6.50 to \$7.50, and the demand was supplied only in part. There is no possibility of any material improvement in the immediate future. As to Coal the situation is no better. The car supply is very short and a universal howl comes from every part of the district, and the burden of it is, "Give me some cars." So irregular and so dilatory are the various railroads in supplying empties to the various mines that the miners cannot get in more than about half time, and the operators are thrown behind in their deliveries. As an instance of the existing condition of affairs there can be cited the fact that a large interest here carrying usually 50 to 60 cars of Coal in their bins as a reserve for their Coke ovens have been compelled to rob them, until they are nearly exhausted of their reserve and the question of refilling is a serious one to them. In January those who are optimistic are hopeful of a material relief of the present situation. But calculations on such probabilities are generally astray. If you can't ship, orders must go unfilled and business is lost. The railroads have been slow to realize the great expansion of business, as they are inadequately equipped to handle the business offered, and which is ever on the increase. Coal is quoted yet at \$2 "run of the mines," ship "when we can."

At the October meeting of the Iron association it was resolved that on all sales made between January 1 and June 1, 1902, and properly registered by the agent, rates in effect at date of sale will be protected until December 31, 1902; 2, that on all sales made June 1, 1902, to September 4, 1902, inclusive, rates in effect at date of sale will be protected to December 31, 1902, inclusive; 3, that on all sales made on and after September 5, 1902, and properly registered, the rates in effect on September 15 will be protected to March 15, 1903, and no longer. This insures shipment of all sales prior to late advances at the old rates.

Like a thunder clap in a clear sky the announcement has come that the Southern Car & Foundry Company have sold out "lock, stock and barrel" to the Standard Steel Car Company of Pittsburgh. The sale, as understood here, includes all their holdings at various points in the South. No particulars are available, as all the officials who can talk are absent in the East completing the transaction. It is current gossip in well posted circles that the plant at Ensley will be pushed to a speedy completion and made larger than original plans contemplated. The change of ownership is a compensation for our failure to secure the plant that Gadsden obtained. It is a valuable acquisition to our industries. It is not out of place to state here that others are preparing to make this district their abiding place. Rumors are current that Captain Elliott will transfer his interests and concentrate them at Gadsden in a new industrial enterprise.

The Alabama Steel & Wire Company have purchased the Alabama City, Gadsden & Attala Railway Company, also the Queen City Electric Light Company and the Gadsden Ice Company, all located at Gadsden. The railway is operated between Gadsden and Attala and traverses the location of the contemplated plant. They have also purchased the Gadsden Land & Improvement Company, which includes their real estate, consisting of over 700 acres, part of which is in the city limits and platted. These purchases make them owners of a large portion of the town and give them a commanding importance in its affairs.

As a matter of information it can be stated that the furnace property at Sheffield lately acquired by the United States Iron Company will be known as the Sheffield Iron & Coal Company. Two of their three furnaces for the present are out of commission and will be rehabilitated as soon as possible, and have skip hoists, new engines and stoves and be up to date in every particular. The company own the Westpoint mines, as well as mines at Russellville, and have bought 6500 acres of Coal land near Stonega and will build Coke ovens without delay to supply their furnaces. In the purchase of the property it was stipulated that the contracts then unfilled should be cared for by the Tennessee Company; so possession was obtained free from any deliveries to be made on old business. Rogers, Brown & Co. are to be the exclusive selling agents. They are in the market. The owners are quoted as having ample capital.

The Hawkins Spring Water Company sold the past week their water property to the Bessemer Water Company for \$100,000. It will be used as a source of supply for that city.

The Steel mill turned out the past week the largest run



in its history, as did the Bessemer rolling mill. This is stated to show that work is being pushed wherever possible to obtain increased results.

We are anticipating this week a visit from a large body of capitalists interested in the district, and it is whispered that important results will follow if impressions made are favorable. We are progressing so far as appearances go as favorably as any reasonable one could ask, and there is nothing in the outlook to decry. Our leading shops have booked work that will keep them busy for six months, and more is offering.

### St. Louis.

CHEMICAL BUILDING, November 4, 1902.—(By Telegraph.)

**Pig Iron.**—While contracts have been closed the past week covering requirements for several thousand tons of Iron for first half of 1903 the total volume of tonnage is indicative of a quiet market. Some negotiations are said to be on for second half delivery, but owing to the uncertainty in price conditions consumers hesitate in placing specifications so far in advance. The market lacks any new or important features, and the price movement shows little change from last report. We quote, f.o.b. St. Louis, as follows:

Southern, No. 1 Foundry.....	\$24.25 to \$28.75
Southern, No. 2 Foundry.....	23.75 to 27.75
Southern, No. 3 Foundry.....	23.25 to 26.25
Southern, No. 4 Foundry.....	22.75 to 25.75
No. 1 Soft.....	24.25 to 26.25
No. 2 Soft.....	23.75 to 25.75
Gray Forge.....	22.75 to 24.75
Southern Car Wheel Iron.....	to
Malleable Bessemer.....	to
Ohio Silvery, 8 per cent. Silicon.....	to
Ohio Strong Softeners, No. 1.....	to
Ohio Strong Softeners, No. 2.....	to

**Bars.**—Active conditions prevail in the market for Iron and Steel Bars, and this will equally apply to the mill and local jobbing trade. We quote from the mills: Iron Bars at 1.90c. to 1.95c. and Steel Bars at 1.80c. to 1.90c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c.

**Rails and Track Supplies.**—The large call for Rails and Track Supplies continues, and the sales departments at this point are negotiating some very liberal specifications for next year's delivery. The railroads in the South and Southwest especially are making liberal plans for betterments and increased mileage, and the demand for all classes of new supplies is coming forward in increasing volume. We quote as follows: Splice Bars at 2.10c.; Bolts, with Square Nuts, at 3c. to 3.10c.; Hexagon Nuts, 3.25c. to 3.30c., and Spikes at 2.60c. to 2.75c.

**Angles and Channels.**—The demand for Small Angles and Channels shows improvement, and the orders now in hand coupled with the new inquiry make a fair showing. For material of this class from store 2.50c., base, is asked.

**Pig Lead.**—The market for Pig Lead, while not evidencing any new signs of activity, remains firm, with price about on the same basis. We quote Chemical at 4c. and Desilverized at 4.02½c.

**Spelter.**—Fairly active conditions rule in the Spelter market, and prices are generally well maintained. Spot Metal is not in liberal supply, and most of the transactions are for later delivery, and 5.15c. to 5.20c. is the general quotation, while slightly higher prices are sometimes heard for material for quick delivery.

### The German Iron Market.

ESSEN, October 22, 1902.

A further slackening of the home demand and increased work for export are the two features of importance which have characterized the German Iron and Steel market since our last report. They show that for all those plants which are dependent upon the open market for the raw material conditions have grown still worse, because the prices received for export orders do not cover cost. The large modern plants possessing their own Coal and their own blast furnaces are still making a small profit. The annual reports which are expected pretty soon will show what the result for the individual concerns has been.

In our home market, as already noted, there has been a further recession, the principal cause thereof being probably the uncertainty as to the course of negotiations on the renewal of the different syndicates. The greatest difficulties seem to have been encountered in the Rhenish Westphalian Pig Iron Syndicate in the case of which the works cannot or will not agree over the new distribution of percentages. During the current year the Pig Iron production supported by the heavy export in raw and partially finished materials has again increased. It has nearly reached the output of the banner year 1900, and it is probable that it will exceed it before the close of the year.

So far as the different branches of the market are concerned it should be noted that a further reduction in prices has taken place in Ores, the Siegen Iron Ore Association

having reduced Roasted Spathic Iron to 14.40 marks per ton. Nassau Red Hematite, with about 50 per cent. Iron, costs 10 marks per ton, f.o.b. mine. Spanish and Swedish Ores are firm in price. There has been a reduction in prices on Spiegeleisen and on special Mill Iron in consequence of the competition of outside works. The other grades of Pig Iron have remained unchanged in price. We quote 10 to 12 per cent. Spiegeleisen, 69 to 70 marks; Special Mill Iron, 58 marks, f.o.b. Siegen; Foundry No. 1, 65 marks; No. 3, 61 marks; Bessemer, 65 to 66 marks per ton, f.o.b. furnace; Thomas Pig Iron, 57.50 marks, delivered consuming works; Luxemburg Mill Iron, 46 marks; Luxemburg Foundry Iron, 50 marks, f.o.b. Luxemburg. The home consumption of Pig Iron has diminished very considerably, and besides this consumers are holding back as a result of the uncertainty about the renewal of the syndicate. The result is that purchases are restricted to an immediate delivery. The export movement in Pig Iron remains heavy, but prices are not remunerative, and in some cases bring less as the result of sharp competition which German works are making against one another.

So far as Billets and Steel generally are concerned contracts for the fourth quarter have been made and prices are nominally unchanged at 82.50 marks for Basic Ingots and Heavy Blooms and 87.50 marks for Ordinary Blooms and Large Billets; 95 marks for Ordinary Billets, about 50 mm. square, and 97½ marks for Slabs, all f.o.b. Dortmund, Ruhrort, Oberhausen or Dierenhofen. On these nominal quotations, however, concessions up to 5 marks per ton are accorded.

As a result of the lateness of the season the Beam business has become very quiet. The same is true of Bars, Hoops, Boiler Tubes, and particularly of Plates and Sheets. Only those works who are exporting have adequate employment, and it is well known that orders of this kind do not leave any profit. The Rail mills are well employed, larger orders having been placed by the Prussian State railroads. In addition to this we have had further export orders; thus, about 55,000 tons for the Canadian Pacific and 35,000 tons for the Southern States.

Machine shops are complaining a good deal about inadequate employment, but it is notable that the machine tool people are not now working for stock, but are delivering to consumers at rather wretched prices.

### Pittsburgh.

(By Telegraph.)

PARK BUILDING, November 5, 1902.

The extent of the cut in price of Tin Plate, 40c. a box, made by the American Tin Plate Company was a surprise to the trade here, the general expectation being that the reduction would not be more than 25c. or at the outside 30c. a box. It will probably be a difficult matter for small dipping plants that have to buy their Black Plate in the open market to compete in the Tin Plate business at the lower prices. The Iron trade is without special change, being strong in spots and weak in other places. Pig Iron, Steel, Structural Shapes and Plates are in heavy demand and prices are strong, while Sheets, Tin Plate and Wire Products are dull in demand and prices weak. So long as the present scarcity of Pig Iron exists and prices remain where they are there is not much danger of a general break in the market, but should the dull demand for products noted above continue the Steel Plants might run short of work in time, thus causing a decline in demand for Pig Iron and a probable reaction in prices. There is no doubt whatever but that prices of Iron and Steel will not be any higher and any change will be in the direction of lower values.

**Pig Iron.**—The Coke situation is worse than ever, and it is said that on Tuesday of this week not a single car of Coke was received in either Valley. Last Friday 18 furnaces in the Pittsburgh and Valley districts were banked for want of Coke and every day from 8 to 12 furnaces are idle. It is probable that some plan will be adopted by which the furnaces will run one week and bank the next until the Coke situation improves. In the meantime very little Iron is being sold, but small lots of Bessemer bring \$23 and higher at Valley furnace. The deal for a large purchase of Bessemer Iron by the United States Steel Corporation from the Bessemer Furnace Association is off for the present. The furnaces have very little Iron to spare for the first quarter and some of them are pretty well sold up into the second quarter. Bessemer Iron for delivery in the first half of next year is \$20.75 to \$21 at furnace, and we note a sale of 4000 tons at the lower price. Forge Iron is quiet in demand and is held at \$21.50 to \$21.75, Pittsburgh, for delivery in the first quarter of next year. Foundry Iron is also quiet, consumers being covered.

**Steel.**—While a definite decision has not been reached in regard to the import duty of Steel, it will probably be allowed to remain at \$6.72 a ton. On several lots of Steel that came through and on which the duty was raised to \$8.96 a ton, this has since been adjusted on the old basis. Prices on domestic Bessemer Billets are easier, and while \$29 is generally quoted, there are reports that Steel has

been offered at lower figures. There is not much buying, consumers holding off for lower prices. Open Hearth Billets, 0.08 to 0.12 carbon, are held at \$31.50 to \$32, maker's mill. Carbons up to 0.40 are about \$33, maker's mill. We note a sale of 1000 tons of Basic Open Hearth Billets, ordinary carbons, at \$32, maker's mill.

**Plates.**—The American Car & Foundry Company have placed an order for 18,000 tons of Plates with a leading Plate mill in the Central West at 1.60c., Pittsburgh.

(By Mail.)

**Plates.**—Tonnage in Plates continues abnormally heavy, and the mills are simply congested with orders. The leading boat builders are reported as in the market for a heavy tonnage of Plates for new boats, but will very probably be unable to get deliveries wanted, owing to crowded condition of the mills. The Standard Steel Car Company have placed contracts within the last week or ten days for 30,000 to 40,000 tons of Plates for extended delivery. It is said the Pressed Steel Car Company are using upward of 1200 tons of Plates a day. Never before in the history of the Plate trade has so much tonnage been on the books of the mills as at the present time, and the outlook is that this condition will last all through next year. The next scheduled meeting of the Plate Association is January 2, 1903, but it is probable a meeting may be held early in December. Plates for shipment within the next two or three months readily command from 1.85c. to 2c., and small lots for spot shipment have sold at higher figures. In fact, the minimum price of some of the Plate mills has been 1.85c. for several months. Official prices for indefinite deliveries for Plates are as follows: Tank Plate,  $\frac{1}{4}$ -inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

**Muck Bar.**—The market continues very quiet, and prices are weak. We quote local makes of Muck Bar at \$35.50, Pittsburgh, but Eastern Bar is being offered at \$33 to \$34, delivered here.

**Hoops and Bands.**—A good deal of tonnage is being placed, and the three leading mills are well filled up. The wire trade on the Pacific Coast is creating a large demand for Hoops and Bands. We quote as follows: Cotton Ties, 94c. a bundle for early delivery; Hoops, 1.90c. for 250-ton lots and over and 2c. in carloads; Bessemer Bands are 1.60c., half extras, Standard Bar card, while for Open Hearth stock \$2 per ton advance is charged.

**Spelter.**—Prompt deliveries of Spelter are held at 5.33 $\frac{1}{2}$ c. to 5.38 $\frac{1}{2}$ c., Pittsburgh. Futures are held at 5.27c. to 5.30c., Pittsburgh.

**Structural Material.**—Last week the Pennsylvania Railroad placed orders for over 30,000 tons of bridge work, all for delivery in first six months of next year. It is understood that work will soon be started on the Oliver Office Building, to be erected on Wood street, in this city, and which will require 10,000 to 12,000 tons. There is a very heavy general demand and a great many large jobs are in sight. There is a feeling in the trade, however, that if prices for material or labor advance any further there will be a falling off in demand for Structural Steel. It is a fact that a good many large contracts are being postponed. Prompt Beams and Channels continue to bring from 2 $\frac{1}{2}$ c. to 3c. a pound. There is still a good deal of trouble in getting deliveries of Structural Steel, owing to crowded condition of the mills and also on account of scarcity of cars and motive power. Official prices for indefinite deliveries are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

**Ferromanganese.**—We quote German Ferro at \$51.50 in large lots and \$52 to \$52.50 in small lots. English Ferro is held at \$52.50, minimum, for large lots and \$55 in small lots. There is not much demand, consumers being covered.

**Rods.**—The market on Rods is fairly firm, but there is not a very large inquiry. We quote Bessemer Rods at \$35.50 to \$36, Pittsburgh, and note that some mills are holding firm for the higher prices. We quote Open Hearth Rods at \$37, maker's mill.

**Bars.**—Only a fair amount of tonnage is being placed and some of the mills could undoubtedly handle more tonnage than is being received. However, specifications on old contracts are coming in better than for some time, and the situation is fairly satisfactory. There are reports of some little shading in Iron Bars, but this has not been verified. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less

than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length. We quote Iron Bars at 1.80c. to 1.85c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, half extras as per National card.

**Sheets.**—Some improvement in demand is reported by some of the mills, while others note that tonnage has shown very little improvement since the lower prices were made. There is a continued scarcity of fuel and also of cars and motive power, and this keeps down output to some extent and greatly retards shipments. We quote Nos. 22 and 24 Black Sheets, box annealed, one pass through cold rolls, at 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. For small lots the usual advances are charged. We quote No. 26 Galvanized Sheets at 3.35c., or 75 and 10 off; No. 27, 3.60c., or 75 and 10 off, and No. 28, 3.85c., or 75 and 10 off. All the above prices are f.o.b. at mill.

**Merchant Steel.**—New tonnage is rather light and the mills report a good deal of trouble in making shipments on account of lack of cars and motive power. Specifications on old contracts are coming in fairly well, but buyers are confining their purchases mostly to small lots. Prices are as follows: Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6 $\frac{1}{2}$ c. to 10c. for ordinary grades and 12c. and upward for special grades.

**Skelp.**—The market continues very quiet and prices are unsteady. We quote Grooved Iron Skelp at 1.95c. to 2c., and Sheared at 2.05c. to 2.10c., delivered Pittsburgh.

**Merchant Pipe.**—Despite reports to the contrary, the National Tube Company have not issued lower discounts on Pipe, but may do so any day. The keen competition of the outside mills will no doubt force the leading interest to make lower prices in order to protect their trade. Buyers continue to place orders mostly for small lots and there is a good deal of cutting in prices. Regular discounts are no longer regarded, but are more or less shaded in almost every sale that is made. In this condition of the market we deem it best to omit quotations until the situation is clearer.

**Boiler Tubes.**—Discounts on Iron Boiler Tubes in carload lots are as follows:

*Iron Boiler Tubes.*

1 to 1 $\frac{1}{2}$ inches and 6 to 13 inches.....	36 $\frac{1}{2}$ %
2 $\frac{1}{2}$ to 3 inches.....	45 $\frac{1}{2}$ %
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inches.....	35 $\frac{1}{2}$ %

**Scrap.**—The market for Old Material shows no important change. There is a fair demand and prices are relatively high, owing to the scarcity and high values of Pig Iron and Steel. Quotations are about as follows: Heavy Melting Stock, \$21; No. 1 Cast Iron Scrap, \$19; Cast Iron Borings, \$11.50 to \$11.75; No. 1 Wrought Iron Scrap, \$21, the latter in net tons.

**Coke.**—Prices on Coke are not as high as they were and the market is more settled in this respect than for some time. It is a fact, however, than anywhere from \$6 to \$8 a ton continues to be paid for Coke for prompt shipment. It is the general belief that Furnace Coke from the smaller operators will be fixed at about \$3.50 a ton for next year shipment. The large purchase of Furnace Coke from the Brown and Cochran interest, amounting to about 300,000 tons, for shipment over all of next year, was at a higher price than \$3, as reported. Lack of motive power continues to be the evil of the Coke trade, and shipments are very much retarded. The fault does not seem to lie with the Coke operators, who are getting out a maximum output of Coke, but entirely with the railroads, which seem utterly unable to furnish adequate shipping facilities. Furnaces in the two Valleys continue to bank more or less, waiting for Coke to arrive. Contracts for Foundry Coke for shipment over first six months of next year are being made at \$4.50 to \$5 a ton at oven.

The Electric Controller & Supply Company of Cleveland, Ohio, have opened a branch office in Room 401, People's Bank Building, Pittsburgh, with John S. McKee in charge. Mr. McKee will look after the Pittsburgh district and expects to do a large business in electrical supplies.

The office of the Cleveland Pneumatic Tool Company, E. J. Earl in charge, has been removed from the Park Building to Room 401 People's Bank Building, Pittsburgh.

## New York.

NEW YORK, November 5, 1902.

**Pig Iron.**—The market has been quiet, but continues firm. Buyers are well provided for some time to come and are apparently not considering the question of a supply for the third or fourth quarters of next year. Little is doing in the way of placing larger blocks of Foundry Iron abroad. Some business, however, has been done in Special and in



Bessemer Pig, and further business is pending. For delivery in the first half of 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, \$23.75 to \$24.75; No. 2 X, \$22.50 to \$22.75; No. 2 Plain, \$21.50 to \$21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, \$24 to \$24.50; No. 2 Foundry, \$23.50 to \$24; No. 3 Foundry, \$22 to \$22.50.

**Steel Rails.**—Some of the trunk lines have placed additional orders, one of them taking about 30,000 tons and another system 10,000 tons. An interesting transaction closed recently for about 6000 tons of Nickel Steel Rails, with an order for an additional lot of 3000 practically placed. These Rails will be made of nickel steel and will contain 3 to 3½ per cent. of nickel. They cost nearly double the price for standard Rails, but are expected to show a life of at least three times that of the ordinary Rails. We continue to quote \$28 at Eastern mill for Standard Sections.

**Cast Iron Pipe.**—Favorable weather for outdoor work causes the demand to be well maintained. Large orders are few, but the volume of small orders is heavy. Prices, tide-water delivery, are as follows: 6 and 8 inch, \$36; 12-inch, \$36.50; larger sizes, \$35.75, gross ton.

**Finished Iron and Steel.**—The bookings for bridge work keep up to the shipments of the leading interest. They are enabled to select the business which they consider most desirable, other works thus getting a goodly tonnage. It is interesting to note that while building operations are slackening in this vicinity the outlook in other sections of the country is improving. It now looks as if the center of building activity is to be shifted to the Mississippi Valley. Reports are very encouraging in this regard from Chicago to New Orleans. Several large structures are soon to be undertaken in the latter city. The Pacific Coast is also expected to take an important part in the building of Steel structures. At present Eastern shops can do little in such remote sections, but it is expected that ere long they will be able to devote some capacity to the work. In other lines trade has been inclined to quietness, but the mills are still well supplied with orders which they have been prevented from getting out rapidly by the scarcity of fuel. They continue to be handicapped on this account. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.85c. to 2c. Foreign Beams are 1.80c. and Angles 1.90c., ex-ship, New York, in 500-ton lots or greater.

**Old Material.**—No improvement is observed in the demand for stock by Eastern mills and Steel works. The railroad offerings are less than expected, however, and stocks are small. Hence a serious decline in prices is not expected. Foundries are still buying Cast Scrap freely. Selling quotations are as follows, per gross ton, f.o.b. cars in this vicinity:

Old Iron Rails.....	\$23.00 to \$23.50
Old Steel Rails, long lengths.....	21.50 to 22.00
Old Steel Rails, short pieces.....	19.00 to 19.50
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	34.00 to 35.00
Old Car Wheels.....	21.00 to 21.50
Old Iron Car Axles.....	27.00 to 28.00
Old Steel Car Axles.....	25.00 to 26.00
Heavy Melting Steel Scrap.....	19.00 to 19.50
No. 1 Railroad Wrought Scrap Iron.....	22.00 to 23.00
Track Scrap.....	20.00 to 21.00
Busheling Scrap.....	15.00 to 16.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	13.00 to 14.00
Wrought Turnings, delivered at mill.....	16.50 to 17.50
Cast Borings, delivered at mill.....	10.00 to 10.50

The Berlin Construction Company of Berlin, Conn., have opened an office in Boston, Mass., in the Board of Trade Building, 131 State street. This office is in charge of H. C. Collins, contracting engineer, who has been for many years identified with the Structural Steel business in New England. The Berlin Construction Company also maintain offices at 220 Broadway, New York, and 142 Market street, Newark, N. J.

## Metal Market.

NEW YORK, November 5, 1902.

**Pig Tin.**—General weakness has dominated the market throughout the entire week. Prices in London commenced to decline yesterday, and when this market opened to-day values fell off considerably. The dropping of prices continued until the close and values on spot are now 0.62½c. lower than they were a week ago. Aside from the absence of business yesterday on account of the election holiday, transactions have been extremely light. Closing prices to-day were as follows: Spot, 26.12½c. to 26.37½c.; November, 25.95c. to 26.05c.; December, 25.25c. to 25.75c.; London, £118 12s. 6d. for spot and £117 futures. The monthly re-statistics show the visible supply on October 31 to have been 58 tons greater than on the corresponding date of last year

and almost 2000 tons less than on Sept. 30, 1902. The total visible supply October 31, 1902, was 16,052 tons, against 18,025 tons September 30, 1902, and 15,995 tons October 31, 1901.

**Copper.**—The market has been very dull and prices have continued on their downward path. Business was light both for home consumption and export. On delivery extending to December 1 the following quotations are now ruling: Lake, 11.62½c. to 11.87½c.; Electrolytic and Casting, 11.60c. to 11.70c.; Standard, 11c., nominal. London recovered slightly from last week's decline to £52 2s. 6d. and £52 7s. 6d. Best Selected declined 10 shillings, to £55 10s. Exports during the month of October amounted to 11,904 tons, being 700 tons lighter than the previous month. The total exports since January 1, 1902, exclusive of Southern ports for October, amounted to 142,356 tons, as compared with 77,221 tons for the corresponding period of last year. The statistical position has not improved, however. The imports from all sources during the month of September reached 10,325 tons, against 12,627 tons of exports. The accumulation during the month of September it is figured amounted to 8486 tons, bringing the supplies here on October 1 up to 119,266 tons.

**Pig Lead.**—Aside from a slight decline in London the situation is absolutely without change. The official quotation is still based on 4.12½c. for spot Desilverized and 4.10c. for futures. The London market declined to £10 12s. 6d.

**Spelter.**—Is easier, with prices a shade off. This market is now quoted 5.40c. for spot and 5.35c. for shipments from the West. St. Louis is quoted at 5.15c. and London at £19 7s. 6., an advance of 2 shillings 6 pence.

**Antimony.**—Is unchanged. Hallett's is quoted 7¼c., Cookson's 9½c., and other brands 7¼c. to 7½c.

**Nickel.**—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

**Quicksilver.**—The market is quiet and unchanged, the ruling quotations being \$48 per flask of 76½ lbs., each in lots of 50 flasks or more. London is unchanged at £8 15s.

**Tin Plates.**—A cut of 40c. per box was made on November 1 by the American Tin Plate Company. The new quotation is on a basis of \$3.60 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and \$3.79, f.o.b. New York. The circular announcing the decline which was sent to the trade by the American Tin Plate Company stated that the differentials for Charcoal Tins, Terne Plates and other products have been changed somewhat. The extent of the cut has not come as a surprise to the trade. It was expected that it would be fully as large and in certain quarters it was believed that a price about 10c. lower would be named. It is reported at the American Tin Plate Company's offices that the new price was productive of a considerable increase in demand. The market at Swansea declined 1½ pence to-day, to 11 shillings 10½ pence.

## Iron and Industrial Stocks.

The uncertainty of the outcome of the Congressional election and the spectre of gold exports operated to restrain stock speculation the past week, and transactions showed a marked falling off in volume. Even Colorado Fuel was comparatively quiet. Fluctuations were within narrow limits. The lowest and highest on Colorado Fuel were 86½ and 89½; Steel common, 39¼ and 40½; Steel preferred, 87½ and 88½; Tennessee Coal, 64½ and 67; Republic common, 21¼ and 22½; Republic preferred, 78½ and 79; Pressed Steel common, 62¼ and 63½; Enameling common, 35½ and 36¾.

**American Car & Foundry Company.**—The American Car & Foundry Company have issued the following statement of earnings for the August quarter:

Balance April 30, 1902.....\$6,670,551  
Net earnings month of May.....518,496

Total.....\$7,189,047  
Less dividends.....675,000

Balance.....\$6,514,047  
Net earnings for quarter ending August 31, 1902.....\$1,804,122

Less reserve for dividends, payable November 1.....675,000

Surplus earnings for quarter.....1,129,122

Total surplus, August 31, 1902.....\$7,643,169

**Dividends.**—The Ashton Valve Company have declared a quarterly dividend of 1½ per cent.

The American Radiator Company have declared a regular dividend of 1¼ per cent. on the preferred stock, payable November 15. Books close November 10 to 15, inclusive.

The directors of the United States Cast Iron Pipe & Foundry Company have declared the regular quarterly divi-

dend of 1 per cent. on the preferred stock, payable December 1. Books close November 10 and reopen December 1.

### Pittsburgh Foundrymen's Association.

A well attended monthly meeting of the Pittsburgh Foundrymen's Association was held in the rooms of the Engineers' Society, at 410 Penn avenue, in that city on Monday evening, November 3. Among those present were the following: J. S. Seaman, Seaman Sleeth Company; James Keegan, United Engineering & Foundry Company; G. J. Springer, Pittsburgh Pulley Company; D. B. Adams, Hydraulic Machine Company; Charles W. Townsend, W. C. Scott, Thos. Carlin's Sons Company; Henry Hoffman, McKee's Rocks Mfg. Company; Howard M. Hooker, Rogers, Brown & Co.; H. J. Dorsey, F. A. Johns, Fred. Bauer, Enterprise Foundry Company; William Yagle, William Yagle & Co., Limited; W. J. Steuver, Pittsburgh Valve, Foundry & Construction Company; E. A. Kebler, Matthew Addy & Co.; Paul Kreuzpointner, Altoona shops, Pennsylvania Railroad; Cort, Wike, Hall Steam Pump Company; C. A. Stroh, American Locomotive Company; S. D. Sleeth, Westinghouse Air Brake Company; Charles S. Wriener and W. J. Reardon, Westinghouse Electric & Mfg. Company; S. F. Warren, Pennsylvania Malleable Company; A. V. Slocum, Keystone Car Wheel Company; D. P. Thomas, Sterritt-Thomas Foundry Company; F. H. Zimmers, Union Foundry & Machine Company; A. O. Backert, *Iron Trade Review*, and Robert A. Walker, *The Iron Age*.

President D. P. Thomas was in the chair and F. H. Zimmers was secretary. The Keystone Bronze Company of Pittsburgh were elected to membership in the association. The subject for discussion at this meeting was "Coke," and a paper on this subject, prepared by N. P. Hyndman of the Washington Coal & Coke Company, was read by the secretary in the absence of Mr. Hyndman on account of illness. Another short paper on the subject of coke was read by C. A. Stroh of the Pittsburgh works of the American Locomotive Company.

S. D. Sleeth, for some years superintendent of the foundry of the Westinghouse Air Brake Company, at Wilmerding, gave a very interesting talk on coke and his experience with coke in foundry practice. Some years ago foundrymen absolutely refused to use coke running over 0.75 per cent. in sulphur. Mr. Sleeth stated that at their foundry they had used for a long time, and with good results, a foundry coke of the following analysis: Moisture, 0.43 per cent.; volatile matter, 2.08 per cent.; ash, 14.67 per cent.; carbon, 82.82 per cent., and sulphur, 1.62 per cent. He stated that the class of work turned out was light castings, but limestone was used as a flux in the cupola and the lime took up a very large part of the sulphur in the coke. For some time, however, they have been using a coke much lighter, which analyzed 0.92 per cent. in sulphur; ash, 10.00 per cent., and carbon, 88.5 per cent. Mr. Sleeth stated that the same quantity of coke which was much lighter would melt the same amount of iron as a heavier coke.

There was a good deal of discussion as to what constituted foundry coke, and the difference between it and furnace coke. Howard M. Hooker of Rogers, Brown & Co. stated that coal charged in the ovens on Friday was not drawn until Monday, thus burning it 72 hours; and this, he understood, constituted 72 hour or foundry coke. Coal charged in the ovens on Saturday was drawn on Tuesday, and this also constituted foundry coke. Most of the foundrymen present stated that they had had great difficulty in getting prompt deliveries of coke, and were very well contented to take either 48-hour or 72-hour coke, if they could get it. It also developed that a number of foundrymen were paying very large prices for coke, in spite of the fact that they had contracts at comparatively low figures. A general discussion took place among the foundrymen present as to their experience with various kinds of coke, and much interesting information was brought out. In fact, this was one of the most interesting meetings of the association that has been held for some time. The Entertainment Committee appointed at the October meeting have prepared a number of topics for discussion at the meetings of the association for the season of 1902-1903, and future meetings promise to be very interesting.

### OBITUARY.

W. S. SWINGLEY.

W. S. Swingley, secretary of the Hoyt Metal Company, St. Louis, died at Kalamazoo, Mich., October 24, of valvular disease of the heart, aged 47. Mr. Swingley had been in failing health for upward of two years and had not been at his desk since January 1. He had held the position of secretary of the Hoyt Metal Company since 1883. Prior to that time, practically all of his business life, he was connected with the E. C. Meacham Arms Company. He began with them as a boy, and entirely through his own ability and energy worked himself up to the position of secretary of that company. He was a man of exceptionally genial disposition and it is asserted that he had more warm friends at the time of his death than any other single individual in St. Louis. He leaves a wife and three children.

#### NOTES.

**WILLIAM LANDRETH**, a prominent citizen of Niagara Falls, N. Y., and who for many years operated a large iron foundry at that place, died on October 19 at his home in Niagara Falls, aged 76 years.

**GEORGE F. WILLIAMS**, president of the Central Expanded Metal Company of Pittsburgh, died at his residence in that city last week. Mr. Williams had been ill for some months and is survived by a widow and seven children.

**ALAN WOOD AND CHARLES LUKENS**, two of the directors of the Alan Wood Company of Conshohocken, Pa., died in Philadelphia last week. Mr. Lukens died October 30 and Mr. Wood October 31. Mr. Wood was 68 years old and Mr. Lukens 66. Both had been connected with the iron trade from their youth.

**WILLIAM D. CADWELL** of Nashua, N. H., a well-known cotton mill agent and prominently connected with the American Society of Mechanical Engineers, died at Nashua on October 15. He was born in Montpelier, Vt., in 1834 and went to Nashua in 1866 as master mechanic in the Nashua Company's cotton mills. He was agent of the Jackson cotton mills from 1871 until 1900 and of the Nashua Mfg. Company from 1891 until his death.

**The Textile-Finishing Machinery Company.**—Under the style of the Textile-Finishing Machinery Company four large Providence concerns manufacturing machinery suitable for the use of dyers, bleachers, printers and finishers of cotton and other fabrics have been consolidated. The new concern are capitalized at \$1,000,000, having headquarters at Providence, R. I. The constituent companies are as follows: Granger Foundry & Machine Company, Thomas Phillips Company, Rusden Machine Company and Phenix Iron Foundry. The active management of the business will be in the hands of the Executive Committee, consisting of Henry A. Tillinghast, E. A. Rusden and Frederick I. Dana, who were before managers respectively of the plants of the Granger, Rusden & Phillips companies. H. Martin Brown of Providence is president.

In October the Pressed Steel Car Company of Pittsburgh turned out at their two steel car plants in that city 3000 cars, an average of 111 cars per day for the 27 working days in the month. This concern have turned out a daily average of 107 cars for the past four months, and for this year up to November 1, 22,402 cars were turned out, the consumption of steel plates and other shapes being about 300,000 tons. In addition to the cars the company turned out many thousands of underframes for wooden cars, steel trucks, bolsters and miscellaneous car parts. The company are making an addition, 120 x 600 feet, to their McKee's Rocks plant, and in this new building will be made car trucks, formerly turned out in the Fox plant in Pittsburgh, which was sold some time since.

**Paul Kreuzpointner**, in charge of tests at the Altoona shops of the Pennsylvania Railroad, states that for the first ten months of this year an average of 3700 tests per month have been made in the laboratories in these shops.



## PERSONAL.

Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, has sailed for the Mediterranean.

J. B. Nau has recently taken charge, as superintendent, of the plant now under construction for the United Steel Company at Canton, Ohio. It will consist of two 35-ton open hearth furnaces and a universal mill.

T. A. Rickard will become editor of the *Engineering and Mining Journal* of New York on January 1, 1903. His associates in the editorial management will be Frederick Hobart, Dr. Joseph Struthers and Samuel Sanford.

C. R. Bowen of Dorman, Long & Co., Limited, Middlesbrough, England, has returned home after a few weeks' study of American plants.

Francis J. Torrance of the Standard Sanitary Mfg. Company, at Pittsburg, has been elected a director of Bucknell University.

Joseph E. Davis, formerly general foreman of the machine shops of the Pennsylvania Railroad Company at Altoona, Pa., has been promoted to the position of master mechanic of the shops at Harrisburg, Pa. W. B. Morris, formerly general foreman of the West Philadelphia shops, succeeds Mr. Davis at Altoona.

R. B. Hayward, formerly Pittsburgh manager of the Buffalo Forge Company, has resigned that position to become Pittsburgh representative of the B. F. Sturtevant Company of Boston. H. D. Wilson of the New York office of the Buffalo Forge Company succeeds Mr. Hayward at Pittsburgh.

J. W. Duntley, president of the Chicago Pneumatic Tool Company, sailed on November 4 for Europe. He expects to spend about four weeks on the Continent, and states that it is his intention to establish, either in England or Scotland, a new plant for the manufacture of pneumatic tools. The design of this new plant will be practically the same as that of the factory now being operated by the company at Detroit, Mich. This move was made necessary by the increase in the amount of business received by this company from England during the past few months.

Clarence H. Woolley succeeds Joseph Bond as president of the American Radiator Company.

Alba B. Johnson of the Baldwin Locomotive Works, Philadelphia, has returned from a trip to Mexico.

William H. Wiley of Wiley & Sons, publishers, for many years treasurer of the American Society of Mechanical Engineers, and the American correspondent of *London Engineering*, has been elected a member of Congress in New Jersey.

Col. Alexander Gordon, chairman of the Board of Directors of the Niles-Bement-Pond Company, has returned from a trip to Europe.

W. T. Shannon, district agent of the American Sheet Steel Company at Chattanooga, Tenn., has been appointed as the company's district agent at Cincinnati, Ohio.

The Monessen Furnace Company of Pittsburgh, an identified interest of the Pittsburgh Steel Company, have received their charter. This concern propose to build three large blast furnaces at Monessen, where the rod and wire mills of the Pittsburgh Steel Company are located. Plans also include a large open hearth steel plant.

The annual meeting of the Pittsburgh Bedstead & Spring Company of Pittsburgh will be held Tuesday, November 18, in that city.

The Greensburg Foundry & Machine Company will remove their plant from Greensburg to Grapeville, Pa. The new plant will be much larger than the old one.

John Bindley of the Pittsburgh Steel Company and Bindley Hardware Company, at Pittsburgh, has sailed for Europe.

The Central Car Wheel & Castings Company of Pittsburgh will change their name to Central Car Wheel Company.

## The New York Machinery Market.

NEW YORK, November 5, 1902.

No change from the conditions noted last week has come over the market. The week was, of course, broken into by yesterday's holiday and it was quite natural to expect a falling off in business for a few days preceding the election. In all branches of the machinery trade business is quiet. Inquiries are being received with much less frequency than a short time ago and the proportion of them which are promptly converted into orders has grown smaller. Such is the condition in the street, but every one says that his shops are filled with work and consequently manufacturers are maintaining prices. All close students in the trade state that the machinery situation is intrinsically good and that the present surface lull should be discounted considerably.

The machine tool proposition of the International Steam Pump Company is still held in abeyance. The Ordnance Department have closed on at least a portion of the machine tool list for the Watertown Arsenal. The orders for the 20 shapers and 20 portable drills were awarded to the Niles Tool Works Company. We hear that the lathe order went to Prentice Brothers of Worcester.

The Brown Corliss Engine Company, who have barely completed a fine new shop at Corliss, Wis., for the building of heavy duty Corliss engines, are already contemplating important expansion. Within the last few months the business of the company has increased so rapidly that it is now found necessary to build a foundry. It is expected that this building will be completed in about 30 days. The concrete foundations have been completed and the steel structural materials are on the ground ready for erection. The building will be 350 x 116 feet and will be fitted with thoroughly modern equipment. An important step will be taken in the direction of the extension of the line of manufacture. It has been decided to build mining machinery, such as hoisting and pumping machines, compressors, &c. Rolling mill machinery will also be built. It is also proposed to increase the agencies of the company in the South and Middle West.

The annual meeting of the Engine Builders' Association of the United States will be held at Sherry's, Forty-fourth street and Fifth avenue, New York, Monday and Tuesday, December 1 and 2. An open meeting for the reading of papers will be held Monday afternoon at 2 o'clock, and several interesting papers have been prepared. An executive meeting for members will open at 10 a. m. Tuesday, and the annual dinner will be served at 8 p. m. of same day. D. N. McBrier, the secretary of the organization, has his headquarters at Erie, Pa.

We are advised on good authority that in connection with the new plant which the Ingersoll-Sergeant Drill Company are to build at Phillipsburg, N. J., work will be pushed forward on the foundry building in advance of the machine shops. The plans for the foundry are complete and the contract for the structure has just been awarded to the McClintic-Marshall Construction Company of 13 Park row, New York City. This building will be about 160 x 600 feet. The plans for the machine shops are not fully completed, but it is known that they will be extensive and will be of comparatively light construction, suitable for the production of the lighter classes of work. No contracts for equipment for the foundry have been made as yet.

The Mossberg & Granville Mfg. Company, Incorporated, of Providence, R. I., have awarded contracts for the erection of a new plant at Pawtucket, R. I. When the new buildings are completed the Providence shops will be abandoned. A considerable quantity of new equipment will be required for the new shops, but the list of such requirements has not as yet been compiled. The new building will be 200 feet in length and 72 feet wide, two stories in height, and of heavy mill frame construction. There will be an ell 96 feet long and 48 feet wide, with a tower 12 x 17; also a blacksmith shop 104 feet long and 45 feet wide. In the first story will be installed the heavy machinery, while at one end will be located the pattern room. Other space will be utilized for setting up purposes and as a shipping department. The floor will be on a level with the platform and railroad cars, by which the greater part of the machinery manufactured will be shipped. In the second story will be installed the lighter machinery used by the company in making their specialties. The roller bearing and grinding room will be located in the ell referred to. In the east end of the upper story will be the offices, with separate compartments for the general manager and superintendent; also the drafting room and photographing department. The blacksmith shop will be high studded, with clear span, with the boiler plant and coal pockets conveniently arranged. In every department there will be modern equipment. The plant will be run by electric power, which will be supplied by the Pawtucket Electric Company. The plans and construction are so arranged that the plant can be enlarged from time to time. Dwight Seabury, mill architect, prepared the plans for the building. The Mossberg & Granville Mfg. Company are a prosperous concern and are located in the Manufacturers' Building, in Providence. George A. Clark is the general manager. The company make a specialty of rolling mills.

wire drawing machinery, presses, dies and special tools and the Mossberg roller bearings.

The American Valve & Meter Company of Cincinnati, successors to the John N. Poage Mfg. Company and the Cincinnati Meter Company, have abandoned for the time being their project for the erection of a new plant. The high building material market is given as the cause for this decision. They have compromised by leasing a large building suitable for their purposes, which they will equip properly.

The Warren Steam Pump Company, Warren, Mass., have outgrown their present plant, and are building an addition, 150 x 85 feet, of brick, one-story high, with monitor roof. The addition will contain a 15-ton crane, with a 40-foot span. A new 85 horse-power boiler and a 75 horse-power engine will be installed.

The Springfield Drop Forging Company, Springfield, Mass., have added two new drops and a pair of shears to their equipment, and further additions are expected to be made soon. H. W. Bundy, who has been with the company for a number of years, has recently been made superintendent.

The Slater Engine Company, Warren, Mass., are very busy on orders for several large engines, among which are two for the Arnold Print Works, North Adams, Mass., one of 800 horse-power, the other of 1000 to 1200 horse-power.

The Ruggles-Coles Engineering Company of 39 Cortlandt street are purchasing elevating and conveying machinery, a number of small steel cars and a grinder plant for the New York Lime Company, who are building a dry slake house plant at Carthage, N. Y. The new plant is to be operated by water power, and will have a capacity of 50 tons daily.

The Alberger Condenser Company of 95 Liberty street have just closed a contract for a duplication of the Alberger high vacuum system of surface condensers which is now being operated in connection with the Parsons-Westinghouse turbine plant at Pittsburgh. The new equipment will take care of three 1000 kw. turbines. There will be a complete system for each turbine, including a Corliss dry vacuum pump. The equipment will be installed at the new power house of the Pittsburgh, McKee's Rocks & Connellsville Railroad at Connellsville, Pa. The Alberger Company also received an order from the Westinghouse Machine Company for another duplication of the Pittsburgh plant, which is to be doubled in size. They also received an order for two barometric condensers aggregating 18,000 horse-power from the Union Steel Company of Denora, Pa. One of these plants is to be operated in connection with the blowing engines being installed at the company's new furnaces.

Recent sales of Renold silent chain by the Link-Belt Engineering Company include nine line shaft drives from motors for the new works of the Patton Paint Company, Newark, N. J.; eight drives from motors to line shafts and elevators in the new model plant which the Crompton & Knowles Loom Works are erecting in Philadelphia, and eight 60 horse-power drives for induced draft blowers in the new Waterside Station of the New York Edison Company. There are now 61 Renold silent chains in use in the new building of R. H. Macy & Co., varying in capacity from 1 to 90 horse-power.

The MacDonald, Wessels & Ames Company of Detroit, Mich., are about to add a line of machinists' hand tools and supplies to their jobbing lines. At present the company are manufacturers and jobbers in bicycle sundries, fittings and tools.

The National Tool Company, New Haven, Conn., manufacturers of Omega steel, have just received a large order from one of the largest and best equipped manufacturing concerns in England for their new steel tools, for which they claim very high cutting powers.

The Truss Metal Lath Company of 40 Gold street, New York, have absorbed the firm of Paul Kuhne & Co. and will continue the business at present in their old quarters. The new company will continue the manufacture of Kuhne's sheet metal structural element for fire proof construction.

The electric cranes for the new plant of the Standard Engineering Company, Elwood City, Pa., will be supplied by the Northern Engineering Works, Detroit, Mich.

Bids are asked by the Mayor and Council of Penns Grove, N. J., until November 12 for the complete erection of a municipal electric light plant and water works, consisting of one 100 horse-power engine, one 60-kw., 60-cycle single phase generator with exciter, &c., two 500,000-gallon compound duplex steam pumps, one boiler feed pump, one heater, two 75 horse-power boilers, fittings and smokestack.

Bids were opened at the bureau of supplies and accounts, Navy Department, on October 28 for supplies for the Navy Yard at Key West, as follows:

- Bidder 1. Buffalo Forge Company, Buffalo, N. Y.
2. Niles Tool Works Company, Hamilton, Ohio.
3. Drew Machinery Agency, Manchester, N. Y.
4. New Jersey Foundry & Machine Company, New York City.
5. Manning, Maxwell & Moore, New York City.
6. R. W. Geldart, New York City.
7. Prentiss Tool & Supply Company, New York City.
8. American Tool Works Company, Cincinnati, Ohio.

9. E. W. Erwin, New York City.

Class 1. Center crank engine—Bidder 1, \$612; 3, \$604.60, \$487 and \$395.50; 4, \$619; 6, \$369 and \$449; 7, \$450.

Class 2. 30 horse-power tubular boiler—Bidder 3, \$500; 4, \$543; 6, 539 and \$559; 7, \$440.

Class 3. Planer—Bidder 2, \$551 and \$577; 3, \$571.53; 5, \$612 and \$634; 7, \$598; 8, \$530.25 and \$612.75; 9, \$583.

Class 4. Radial drill—Bidder 8, \$505; 2, \$515; 3, \$545; 5, \$625.

Bids will be received at the Ordnance Office, War Department, Washington, until November 29, for supplying 15, more or less, 15-pounder (3-inch) guns with barbette type pedestal mounts, with accessories complete, of American manufacture. Bids will be received for parts or all of foregoing, which must conform to detailed drawings.

Proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, until 1 o'clock, November 22, 1902, for constructing a coal storage and coal handling plant at the navy yard, Portsmouth, N. H.

Proposals will be received at the office of the Louisville Water Company, 549 Third street, Louisville, Ky., until December 20, for pumping engines, boilers or furnaces, &c. The pumping engines will be of 30,000,000 and 24,000,000 gallons capacity.

Proposals will be received at the office of the Water Commissioners, Brockton, Mass., until November 8 for furnishing and erecting complete on foundations furnished by the city, one vertical triple expansion condensing crank and fly wheel pumping engine of 6,000,000 gallons daily capacity.

### Cleveland Molders Strike.

In six Cleveland shops 613 molders went on strike Monday morning for a 15 per cent. advance in wages and recognition of the union. At present only the light gray iron molders are affected, and on the first day of the strike only half of the shops doing this class were closed up. They are the Acme Foundry Company, the Standard Foundry & Mfg. Company, the Ohio Foundry Company, the Walworth Run Foundry Company, the Fanner Mfg. Company and the Hoffman Hinge & Foundry Company. It is quite probable that the men in the other shops of this class will be called out if the strike is not settled in the near future. The demands made by the molders' union were presented to the Cleveland Founders' Association on October 16. The demands in brief were: A readjustment of the piece work scale amounting to a general advance of 15 per cent.; that when a piece of work was given to a molder a tag should be attached giving the price of doing the work; that the men be allowed to see their discounts or reductions for faulty or unsalable work; that a union committee of three men be appointed in each shop to arbitrate differences between men and employer. Several meetings were held but without result, and the matter was then referred to the National Founders' Association. A conference was held October 30 between the national bodies of the two controlling organizations, but no agreement was reached, although the foundrymen were willing to grant several concessions; they would not, however, grant the general increase in wages or recognize the union committee. As the result of this meeting the molders' union called out the men.

The McConway & Torley Company, the Pennsylvania Malleable Company, the Fort Pitt Malleable & Gray Iron Company and probably the Pittsburgh Malleable Company will not be included in the list of malleable iron concerns who are to be consolidated.

The Standard Steel Car Company, at Butler, Pa., are now turning out about 35 steel cars a day, and this output will be eventually increased to 60 cars. The concern are now finishing up contracts for 1000 cars for the Chesapeake & Ohio Railroad and 500 cars for the Mobile & Ohio Railroad.

There is a great scarcity of puddlers in the Pittsburgh district, and almost every day Secretary Williams of the Amalgamated Association is in receipt of letters from different concerns asking him to supply puddlers if possible.

The Bethlehem Steel Company, Bethlehem, Pa., have opened an office in the Keystone Building, Pittsburgh, with C. H. Hastings in charge.



## The Chicago Machinery Market.

CHICAGO, ILL., November 1, 1902.

The general tenor of advices from manufacturers of machinery—including engines, boilers, pumps, &c.—situated in a circle having a radius of 100 miles or so, described from Chicago as a center, is encouraging, indicating continued activity in most lines of industry consuming iron and steel. As a rule, business during the month of October, 1902, has exceeded that of the corresponding month last year by from 10 to 25 per cent. Thus far the volume of trade for the year 1902 is said to show an increase of from 25 to 50 per cent. over the corresponding time during 1901, with the outlook favorable for continued activity during the remainder of the year, this opinion being based on orders already booked and upon active inquiry for new equipment which will carry manufacturers under full pressure for months to come. There are conspicuous exceptions, however, several manufacturers noting a decided falling off in new business and others indicating a change in the character of trade which seems to foster the idea that high tide has either been reached or is approaching. But the momentum gained during the past six months has been great enough to carry the majority well into 1903. It is notable that orders are coming now from a large number of firms in lines of trade that were barely represented in the market a year ago, but even so the demand is less for large units and for special types; machines of less capacity and of standard makes finding a more ready sale than heretofore.

There are few manufacturers who have not referred to the difficulty encountered in obtaining ample supplies of pig iron and coke, but, as a rule, this complaint comes from the larger consumers of such material rather than from the smaller concerns; yet large and small manufacturers note an improvement in this respect, although there is still considerable inconvenience suffered from the delay in obtaining such supplies as copper wire and bars, large sizes of steel and many shapes of soft steel. The shortage of cars and motive power is being felt, but yet even these conditions seem to be improving, some of the largest manufacturers noting that out freight shipments are being made with less delay.

It may be that the increased facilities of manufacturers through the building of extensions and new plants with larger equipment, which have increased capacity to a liberal extent, are the cause for the closer adjustment of output and consumption of manufactured articles. But, even so, it should not be lost sight of that many manufacturers are still expanding, building new plants and increasing equipment, with some special lines working day and night.

Most manufacturers have suffered from the strike in the anthracite coal fields, but "it is an ill wind that blows nobody good," and some manufacturers of engines, boilers and pumps attribute their increased activity to this very cause which has been such a drawback to other producers.

It is notable, too, that there is a sentiment prevailing among a certain class of manufacturers that raw material must decline soon after the first of the year, with the saving clause that if such is not the case there must be an advance in the prices obtained for manufactured articles. An interesting feature, too, is that even conservative manufacturers are giving voice to the opinion that some kind of concerted action must be taken to supply consumers with raw material more advantageously. Whether this refers to price, time of delivery or quantities is not made very clear, but probably all of these considerations enter more or less into the thoughts of manufacturers who are awake to the changed and changing conditions evident in the industrial world.

Such manufacturing plants as have experienced a falling off in business are philosophical enough to welcome the lull that they may make needed improvements, or be given an opportunity to accumulate stock, which they have been unable to do for many months, and they are fully persuaded that whatever falling off in orders they may have experienced is merely temporary, and they have the courage of their convictions in that they are contracting for new machinery and endeavoring to increase their working force. All along the line there is an endeavor to reduce the cost of manufacture by the installation of new labor saving devices.

### Power Transmission Machinery.

Pawling & Harnischfeger, Milwaukee, state that booking of orders during October has been satisfactory, and that the volume of business compared with the same month of 1901 shows an excellent increase. Orders are coming from a larger number of firms and in lines of trade that were barely in the market a year ago. The demand seems for cranes of not so large capacity, and the needs at present are less for special types. The outlook is very encouraging, with inquiries well sustained. The ability to gain supplies is bettering, and while it remains difficult to get pig iron, yet the outlook is more favorable. The coke situation is brighter. There still remains delay in promptly securing copper in wire and bars. Large sizes of round steel, also many shapes in soft steel, are still slow in coming. Out freight shipments are improving, yet there is still a bad shortage of long flat

cars for crane bridges. The buildings and land secured by this firm last August are now in service and the foundry changes will be completed within 30 days. The time required to complete a crane or hoist has been considerably shortened, compared with two months ago, and the improved arrangements permit a much more economical handling of all material. The sales made by Pawling & Harnischfeger during October are partly represented as follows: Baldwin Locomotive Works, Philadelphia; Manitowoc Steam Boiler Works, Manitowoc, Wis.; Consolidated Railways, Light & Power Company, Wilmington, N. C.; Pennsylvania Lines west of Pittsburgh, Fort Wayne, Ind.; the Lorain Steel Company, Johnstown, Pa.; American Sheet Steel Company, Cambridge, Ohio; Berlin Machine Works, Beloit, Wis.; the Lorain Foundry Company, Lorain, Ohio; Allis-Chalmers Company, Chicago; Colean Implement Company, Peoria, Ill.; Gruson Iron Works, Eddystone, Pa.

The Northern Electrical Mfg. Company, Madison, Wis., say that their business for October has been the largest in their existence; in fact, each month for the past year has brought to them more and more business, and they are doing their utmost to take good care of patronage which has been so generously bestowed. They recently completed one addition of 100 feet to their plant, and are now erecting two other additions, each 100 feet long, one of them 90 feet wide and the other 50 feet wide. With the aid of these they hope to be able to keep pace with the growth of their business, though they have plans in view for further extensions at the beginning of next year should trade conditions continue as good as at present. The general character of the business is first-class, payments being made promptly by all customers, and they are at present unable to see any indications of weakness anywhere along the line.

The Stephens-Adamson Mfg. Company, Aurora, Ill., are having a very satisfactory business, as far as inquiries and orders are concerned. The great difficulty has been that of getting castings, caused by the scarcity of coke during the last 60 days. As compared with a year ago, their business is much larger, prices are very satisfactory and they anticipate a good business for the next six months.

The Industrial Works, Bay City, Mich., report the volume of business done during October about the same as for the corresponding period of last year. Business continues good and their capacity is entirely filled.

### Engines, Boilers and Pumps.

The American Steam Pump Company, Battle Creek, Mich., have found trade during October of the present year 10 per cent. greater than in the same month of the preceding year. During the month they have added a large turret lathe, made by the American Turret Lathe Company, Warren, Pa.; one 24-inch turret lathe, made by the American Machine Tool Company, Cincinnati; one 4-foot radial drill, made by the Fosdick Machine Tool Company of Cincinnati; a double spindle boring machine, made by Beaman & Smith of Providence, and other minor tools. They believe the outlook for business for the next few months, based upon orders in hand, is very bright. They have not experienced any trouble in receiving raw material, except pig iron. On account of the strikes and other troubles they have been obliged to buy Scotch iron to take the place of domestic Southern iron. Their experience has been that delays are due more to the manufacturers themselves than the lack of transportation facilities, but they are assured of better deliveries from now on. Their business for the year will show an increase of 25 per cent. over 1901.

The Model Gas Engine Company, Auburn, Ind., say that business has been very good indeed for the past six months, and the outlook for the future is fully as good or better. They are running their plant night and day, and employing something over 120 men exclusively on gasoline engines and friction clutch pulleys. They have recently closed several new contracts, notably one with a party in Paris, France, which will take care of a large portion of their output. They are building engines running from 2 to 100 horse-power in size, but devoting their attention especially to the larger sizes. Their output is marketed principally by a few large supply houses. They have had a great deal of trouble in getting pig iron and coke, but have not been compelled to shut down as yet for want of either. They have not yet advanced the price of their product, but if the prices of pig iron and coke continue at present figures they will be compelled to do so soon.

The Quincy Engine Works, Quincy, Ill., state that their trade during the month of October was very satisfactory, and the product of their plant has been sold so far ahead that the question of increasing their capital stock to \$400,000, with a view of increasing their output, will be submitted at the annual meeting next month. The foundry output has been somewhat lessened lately by reason of failing to receive pig iron as per contract, but they expect relief shortly. Difficulty has also been experienced in getting prompt delivery of other material entering into their output. The trouble appears to be due to both lack of transportation facilities and the inability of manufacturers to fill orders.

The Aetna Foundry & Machine Company, Springfield, Ill., say the trade in their line for the month of October was

very active, due to the coal strike in the anthracite field, which has increased the demand for equipment for the local bituminous coal fields. The outlook for the remainder of this year looks bright and the volume of business will probably exceed that of any preceding year. They look for a reduction in price of raw material before January 1 or soon after, and more prompt deliveries.

The Union Steam Pump Company, Battle Creek, Mich., state that they are installing two Erie City water tube boilers of 150 horse-power each; building a new foundry and store rooms and installing new machinery. The present outlook for the future is encouraging, as it always is with them at this time of year, having now on hand orders for next year's delivery aggregating something like 4000 to 5000 machines. The price of material remains about the same and, if anything, has an upward tendency. They are very well satisfied with present conditions.

The Nordberg Mfg. Company, Milwaukee, Wis., say that the same old story of inability to make deliveries within a reasonable time has continued during October. The outlook for the future seems bright and promising to them, they being utterly unable to discover any cause for unfavorable reaction.

The Witte Iron Works Company, Kansas City, Mo., say that they have no complaints to make as to the volume of business, but find competition is forcing down prices, while at the same time raw material keeps advancing a little. To them it seems it will be necessary, sooner or later, for manufacturers to get together in some kind of a movement whereby they will be able to supply themselves with raw material more advantageously.

#### Special Machinery.

The Marinette Iron Works, Marinette, Wis., state they are at present enjoying a very good business, having more orders booked than at any one time for the past three years. The month of October shows a great increase over the corresponding month last year, and they now have orders enough booked to keep their plant fully employed for the next three or four months, and are figuring on a great many large contracts which they expect to consummate within the next few weeks. They are experiencing no difficulty in obtaining raw material, excepting coke, which they are having a great deal of trouble in securing. They have many orders booked for saw mill work, particularly in the gas engine line, having during the past year increased their sales over 50 per cent. over the preceding year, and from present indications the coming year will show a greater increase over the past year.

The Novelty Iron Works, Dubuque, Iowa, say the volume of business for October was not up to the standard, but they are very thankful for the slight falling off of orders, as it gives them a much needed opportunity to accumulate stock. They expect a better trade than ever between now and the first of the year, and have added some new machinery and more help with that end in view. They have also just completed the installation of their own incandescent lighting plant. They are now enabled to secure raw material more promptly than for some time, and believe the waiting period is about over. They expect to add warehouse room to take care of accumulating stock, but no further addition to their machinery equipment is contemplated.

The Vilter Mfg. Company, Milwaukee, state that the machinery business in their line has been very good during October. They closed some large contracts for Corliss engines, also for ice machines, and are very well pleased also with the outlook for the near future. They are making an addition to their foundry, increasing the capacity considerably. Raw material has been coming in but slowly the past several months. They believe that the manufacturers are to blame to a certain extent, though they expect that the lack of transportation facilities has considerable to do with it. The business at this time compared with the corresponding period a year ago shows a marked increase.

Williams, White & Co., Moline, Ill., find the outlook as favorable as ever. There has been a tendency all along the line for prices to stiffen in accordance with the advance in materials, and there is also a general tendency for labor to advance. They find the volume of business at this date considerably larger than a year ago. As far as raw material goes, the only things that trouble them are coke and steel castings. Other materials they have been able to get by ordering sufficiently in advance.

The Webster Mfg. Company, Chicago, say that trade continues up nearly to high level mark. They have more work booked in advance than they can get out in several months. They see, however, some signs of letting up in some of the smaller trade. They are having great difficulty in getting shafting and also in getting pig iron.

#### Machine Tools

The American Machinery Company, Grand Rapids, Mich., say that October was the best month they have ever had. They are constantly installing new equipment and are adding a new 5-foot arm radial drill. They have a larger number of unfilled orders on their books than they have had for a long time. Their foreign branch at Manchester, England, is making heavy demands upon them for their Oliver pattern

shop machinery. They have thus far experienced no difficulty in obtaining raw material except cold rolled steel, and the lack of this, although it has been ordered for three months, has very seriously inconvenienced them. They are doing fully 50 per cent. more business now than they were a year ago.

The B. F. Barnes Company, Rockford, Ill., are receiving all the orders they can possibly take care of, their factory being crowded continually to its greatest capacity. They are several carloads behind in orders now, and there seems to be no end of new incoming orders. They are experiencing little if any difficulty in securing raw materials. While business for October, 1901, was very good, the volume for October of this year was fully 50 per cent. over that of a year ago. They have recently added a new office building to their plant. The outlook for the balance of this year, as well as 1903, is certainly very promising, and they feel sure of having all the business they can take care of.

The Geo. Whiting Company, Chicago, report that business has been satisfactory during the month of October, and far better than could be expected from a concern so young in the business, with prospects that the month of November will exceed all past months. During October they shipped a number of machines of their manufacture and are now getting out improved riveters for driving cold rivets by belt power. They report a large amount of new inquiry and anticipate a very large business after January 1, as all conditions seem to warrant the idea that a great many firms will greatly increase their equipment after January 1. Deliveries of raw material have been very satisfactory, and outside of the slight delays at the foundries they have experienced no great difficulty in securing what material was wanted and getting it quickly. One peculiar feature of their business they have noticed lately is that the trade seem to be demanding a higher and better grade of goods, and it is not now so hard to convince a man that a first-class machine is the cheapest in the long run, even though the first cost is higher, and the keenest interest is evinced in any improvement on old style machines now in use that will tend to make them more efficient and reduce the maintenance cost besides reducing the cost of production. This indicates the plentitude of money, permitting firms to expend sums on betterments, where otherwise they would "make do" what they were equipped with.

The Armstrong Bros. Tool Company, Chicago, state that the condition of business in their line continues to be very satisfactory. The latter part of the past month has shown a slight falling off, and they have taken advantage of this to make some extension and improvements in their plant, as all the indications point, in their opinion, to a heavy increase of business in their line.

The Hoefler Mfg. Company, Freeport, Ill., say that their business keeps up to expectations; although the demand is usually lighter in the fall than at any other time, they are pleased to state that they have not had any occasion to complain this year; in fact, their special work is on the increase.

The Hill Tool Company, Anderson, Ind., say that their business is keeping up remarkably, and it is quite an improvement over the last year's business for the corresponding month. Their foreign trade is exceptionally good, as they have been able to place agencies in several countries in which they have heretofore had no agencies.

The Luther Bros. Company, Milwaukee, Wis., have recently moved their plant from Milwaukee to North Milwaukee, where they have secured larger room and trackage. The outlook for orders is good. They have experienced but little delay in securing raw material which enters into the composition of the articles which they manufacture.

Hill, Clarke & Co., Chicago, advise us that trade in their line has been very satisfactory; in fact, has never been more so.

#### Tools and Supplies.

The D. Clint Prescott Company, Menominee, Mich., state that the trade they experienced last month was beyond expectations, and they are so crowded in their foundry that they have decided to build an addition and add a larger cupola with its necessary equipment, so as to double their capacity. They have noticed no decrease in orders; on the other hand, business has been on the increase. They think it is a little easier to get raw material than it has been. The increase of the volume of their business over that transacted at the corresponding time last year is about 25 per cent.

The Stover Mfg. Company, Freeport, Ill., report that business with them for the past month was rather light and not up to the corresponding month of last year except in the hardware department, which has been most excellent and considerably improved over last year. This season of the year is naturally the duller with them, and therefore there is nothing specially interesting to report. For the past few months they have had no difficulty in obtaining all the materials needed; in fact, material men have seemed to be anxious to unload, and in several instances on different classes of materials, shipments have been made to them in excess of specifications. In everything but the coke line they have had no trouble in securing ample supplies, and are of



the opinion that high priced materials will very soon take a tumble to more reasonable figures.

Chas. H. Besly & Co., Chicago, report that sales of grinders, which they are shipping to New York, Philadelphia and the Pacific Coast, are keeping up remarkably well, and they have experienced an exceptionally large trade for grease cups from makers of agricultural implements and from manufacturers of wood and iron working machinery. In fact, orders have been such that their capacity has been crowded to keep pace, and their sales of lubricating oil have called for a wider distribution than ever before, which they ascribe to the general prosperity among the people using machinery. The demand for taps, too, of their manufacture is calling for an increased output. They note that they have experienced less difficulty recently in obtaining raw material, especially of cast iron and steel, but they have made a special endeavor during the past year to accumulate stock. Compared with the corresponding time a year ago, their business shows a substantial increase, and from present indications there will be no decrease in the immediate future, as customers are not only taking goods contracted for, but in some cases are asking for more.

The Anderson Tool Company, Anderson, Ind., report their arc lamp and electrically driven grinder departments exceptionally busy. They have added a gas engine department and are now building a small gas engine for farm use. Their output on engines at this time will average one complete engine per hour. Collections in all departments are satisfactory, and the only difficulty is in securing castings.

Joseph T. Ryerson & Son, Chicago, advise us that the demand for tools of every kind in their line is increasing, and while the small and moderate sized tools are selling at a rate heretofore unknown, the very heavy equipment is in demand to such an extent that the makers will not be able to supply the tools wanted for installation during the coming winter. Requisitions are reaching them not only from railroads and important existing plants, but many new projects with ample financial backing are negotiating for equipment. There is every reason to believe that the shops of the makers will be more congested during the coming season than ever before.

The Reeves Pulley Company, Columbus, Ind., say that they have no reason to complain of business, either on their books or in prospect. At this season of the year they do not expect a great number of heavy stock pulley orders, but the demand for "specials" has kept them uncomfortably busy. In the transmission department they have orders booked which will keep them busy until 1903 is well advanced. They have apparently as much trouble at this time in getting orders for material executed as at any period of these troublesome times of intense prosperity. They are expecting that 1903 will be a good business year. To this end they are enlarging several departments of their works. They have determined to erect a large foundry in the spring, and are now building new brick dry kilns, new stables and making a number of repairs.

The Chicago House Wrecking Company, Chicago, say that things are not so brisk in the machinery line as they were 30 days ago. While it is true they are very busy on present shipments, there seems to be a let up to inquiries.

### Boston Machinery Market.

BOSTON, MASS., October 31, 1902.

There is considerable monotony in this week's reports of the Boston dealers in machinery and machine tools. So far as can be learned there has been no change in business conditions during the past two weeks, and everybody seems satisfied with the outlook. A few dealers in special lines say that their business is a trifle quiet, but that it is not at all abnormal, and that there is no cause for worry. Even if there is no talk of a boom there certainly are no croakers to be found. In short, it is the consensus of opinion that business is good and "no complaints coming." There are few, if any, complaints regarding slow deliveries. Manufacturers are apparently "catching up with the procession" and getting into a position more agreeable to the dealers who, naturally, like to be able to definitely fix the date on which their goods will be in the possession of purchasers. There are expressions of relief at the ending of the coal strike and the consequent end to anxiety as to its near effect upon general business. Some dealers report a goodly number of inquiries, but with few resultant sales so far. There seem to be no great demands for any special lines of machinery or machine tools, inquiries being of a general nature.

James F. Lanigan of the Davis Iron Foundry of Lawrence, Mass., has purchased the controlling stock of the Emerson Mfg. Company, manufacturers of paper mill machinery in the same city.

The New England Structural Company have let the contract for a one-story brick power house at their plant in Everett, Mass. The new building will be 44 x 79 feet.

The State of Massachusetts is to build a one-story pumping station in the Roxbury district of Boston. The building will contain a boiler room, an engine room and a coal pocket.

A caisson over 100 feet long, built by the William Cramp Sons Ship & Engine Building Company, has arrived at the Charlestown Navy Yard, and will be used for the new dry dock.

Eugene N. Foss of the B. F. Sturtevant Company is the prime mover in the organization of the New England Reciprocity League, which proposes to impress the commercial and industrial needs of New England upon the business men of this section, with special attention to the necessity for better reciprocal trade relations with Canada. Thomas A. Watson, president of the Fore River Ship & Engine Company; George T. Coppins, secretary of the Walworth Mfg. Company, and Henry D. Sharpe of the Brown & Sharpe Mfg. Company of Providence, R. I., are among those associated with Mr. Foss in the formation of the league.

Shepley, Rutan & Coolidge of Boston are preparing plans for a new steel, brick and stone building, ten stories high, to be erected in place of the First National Bank Building at the corner of State and Devonshire streets. The estimated cost above ground will be over \$500,000.

### The Philadelphia Machinery Market.

PHILADELPHIA, PA., October 31, 1902.

Although the tone of the Philadelphia machinery market has been generally fair during the past month, signs of weakness have developed in some few lines. The activity in some branches is still unabated, and many have their plants taxed to the utmost, some with their capacity contracted for three or even six months ahead and others with orders for a good amount of business for 1903 delivery, while others are only maintaining an even keel with good daily business coming in. The particular element of weakness is probably only temporary and will adjust itself after awhile. Inquiries in most lines are good, and considerable business is being booked, so that there is no fear of any serious interruption in the prosperity of the machinery trade. The effect of the anthracite coal strike, with the accompanying shortage of pig iron and coke, has been felt to a greater extent during the past month than at any previous time during the strike, which is now fortunately at an end. Pig iron and coke are still very scarce, and it is hard to obtain anything like reasonable deliveries. This has had a material effect on the trade, and has made deliveries, which otherwise would have been fair, a very uncertain quantity. No improvement can therefore be noted in deliveries of heavier and special tools, but for the lighter and standard tools fairly prompt shipments can be made. The transportation feature, however, continues to play an important part, and cases are to be noted where deliveries of tools to buyers have been delayed for weeks, due to insufficient transportation facilities.

Foreign demand for machine tools is decidedly weak, although in some lines it has become very active, a large increase in orders for pneumatic tools being noticeable.

The various iron and steel foundries continue extremely busy, and it is very hard indeed to get prompt deliveries from either. Nearly all have been affected to a greater or less extent by the existing scarcity of raw materials. Foreign pig iron has been used in varying quantities by most of the foundries and has tided over the pig iron shortage to some extent. Coke has been particularly scarce and a number of foundries have had at different times to make temporary stoppages for lack of one or the other, and sometimes for both of these materials.

The demand for boilers and engines continues active and prompt deliveries are an exception. Manufacturers in these lines have a good volume of business ahead, and will be busy for some time to come. Machine shop supplies have been hard to get, there has been a continued active demand for this line of goods, and manufacturers of the various specialties have been taxing their capacities in order to make deliveries.

Prices generally are being well maintained, and if a purchaser wants the goods he is willing to pay the price, even to giving a bonus if the date of delivery can be advanced. Very little manipulation of prices on the whole is noticeable.

The Falkenau-Sinclair Machine Company continue busy. Inquiries are numerous and a number of satisfactory orders have been booked, including among others several for testing machines; two 100-ton and one 200-ton hydraulic presses and a number of tools of special design. Considerable difficulty has been experienced in getting deliveries of raw materials, but a number of large tools are now about ready for delivery. A 500-ton power press has been shipped to an Eastern hardware manufacturer, and several Nos. 2, 3, 4 and 5 presses have also been delivered. A large plate test specimen milling machine has also been shipped for Western parties.

Thomas H. Dallett & Co. have recently booked orders for 20 No. 1 rope driven electric portable drills for the Watervliet Arsenal of the United States Government, and report inquiries and orders on their various lines as quite satisfactory. All departments are running full time, and conditions are favorable for their so continuing. Recent shipments of drills by these parties include five electric portable drills for the Sharon Steel Company, Sharon, Pa., and a No. 4 for the General Electric Company, Schenectady, N. Y.

The Philadelphia Pneumatic Tool Company advise us that sales of pneumatic tools during September were 20 per cent. above their sales for any other previous month, and the monthly record for foreign sales was also exceeded, large orders being received from Great Britain, Germany, France, Italy and Denmark. Among domestic orders received was one for a large number of drills for the Lackawanna Steel Company, Buffalo, N. Y., and a notable increase is mentioned in the demand for foundry rammers. Among the recent shipments were 27 chipping hammers for the United States Government for the Brooklyn Navy Yard, and 12 rammers were shipped to the Buckeye Malleable Iron & Coupler Company, Columbus, Ohio.

The American Pulley Company note a further increase in demand for their line of goods for export and for home trade during the past month. The foreign demand has increased, particularly on the European Continent, in Japan, India, Australia and Mexico, to all of which countries deliveries have lately been made. Trade in this country is general—large shipments, however, have recently been made for Western delivery.

The Link-Belt Engineering Company have completed the installation and complete equipment of a 3000-ton wholesale coal storage plant for the Baltimore Storage & Distributing Company, at Baltimore, Md. This plant will be used for both anthracite and bituminous coal. A large amount of general work is in course of completion, and numerous equipments for handling various materials have been shipped.

The Eynon Evans Mfg. Company have their new foundry about under roof, and will soon begin installing equipment; at present they desire catalogues of air compressors, vertical boilers and oil burning apparatus and furnaces. General business conditions, we are informed, are very satisfactory to this company, all portions of their plant being busy. Steam jet blowers have recently been shipped to London and Wales, one noticeable order being the equipment furnished to the British Westinghouse Company, Manchester, England.

The Tabor Mfg. Company have had a number of orders for molding machines of the vibrator frame type during the past month. Orders for a large number of single machines of various styles is also to be noted. Their new flask filling device for attachment to molding machines is meeting with favor, and shipments of same have been made to Birmingham, Ala., and for export to England. Twenty machines for molding hardware specialties, in addition to the 23 already shipped the Russell & Erwin plant, have been shipped to the P. & F. Corbin plant, New Britain, Conn. Two 16½ x 21 inch split pattern vibrator frame machines have been delivered to Birmingham, Ala., parties, and one 24-inch square, one 14 inch by 16 foot and one vibrator frame molding machines have been shipped to the Ridgeway Dynamo & Engine Company, Ridgeway, Pa. The completing parts of the large triple element power ramming molding machine for the Bethlehem Steel Company have been shipped, and it is expected that the machine will shortly be in operation.

The Energy Elevator Works have been very busy equipping many local elevators with their new speed governing device. Orders for freight lifts have also been very numerous, and include among others, Belt Power freight elevators for Coxsackie, N. Y., and the Grand Rapids & Indiana Railroad Company, Grand Rapids, Mich. Hand power freight lifts will be shipped at an early date to Covington, Va.; Fond du Lac, Wis., and Madison, Maine. Four special hoists have been ordered by the Consumers' Ice Company, Atlantic City, N. J., and a 4000-pound lift will be installed at Dalton, Mass. Contract has also been signed for three elevators for the new Lulu Temple, A. A. O. N. M. S. in this city.

Alfred Box & Co., manufacturers of cranes, hoists, &c., have a large amount of work on hand, and the capacity of their plant is being taxed to meet deliveries. Some recent shipments of cranes include four electric jib cranes for the locomotive repair shops of the Philadelphia & Reading Railroad shops at Reading, Pa.; four electric jib cranes for the Buffalo plant of the International Steam Pump Company; a 10-ton three-motor traveling crane for the Baldwin Locomotive Works, Philadelphia, and a 20-ton three-motor traveling crane for the R. D. Nuttall Company, Pittsburgh, Pa. Orders have also been booked for six 10-ton two-motor electric traveling cranes and two 5-ton portable electric jib cranes for the General Electric Company, Schenectady, N. Y.; two 7½-ton portable all electric jib cranes for the Rosedale Foundry Company, Allegheny, Pa.; one 30-ton, 60-foot span, double trolley, five-motor crane for the Diamond Drill & Machine Company, Birdsboro, Pa., and a 10-ton three-motor electric traveling crane for the new addition to the Morse, Williams & Co. shops in this city.

The Hess Machine Company, manufacturers of file making machinery, report a good trade, particularly for export

to England; three sets of machines having recently been exported to that country, with several other sets nearing completion. A number of file machines and some special machinery is also building for domestic shipment.

The continuous activity of the crane department of the Niles-Bement-Pond Company is to be noted. The various improvements to the plant previously noted in this report are progressing satisfactorily, and are expected to be completed by the end of the year. All departments are now being operated on double turn, in order to keep up with deliveries. Among some recent deliveries of cranes may be mentioned 11 electric traveling cranes for the Union Pacific and Oregon Short Line railroads at the Omaha, Nebraska and Pocatello, Iowa, shops. Two 60-ton cranes, with 10-ton auxiliary hoists, have been shipped to the Mexican Central Railroad, Mexico City; one 100-ton and two 22-ton cranes for the Rogers Locomotive Works and a 120-ton crane for the Richmond Locomotive Works. Cranes are also under construction for the following: One 100-ton electric traveling crane, with Westinghouse alternating current motor, for the Southern Pacific Railroad at San Francisco, Cal.; one 125-ton crane for the Pennsylvania Railroad Company meadow shops; five 75-ton cranes, with 10-ton auxiliary hoists, are also building for the Armour plate department of the Carnegie Steel Works plant of the United States Steel Corporation.

The Wm. Cramp Ship & Engine Building Company recently launched the new steamship "Huron," building for the Clyde Line. This vessel is 300 feet long, built of steel and will be equipped with triple expansion engines. She is 40 feet beam and 30 feet molded depth, and will have a displacement of 4480 tons. The "Huron" was designed for the Southern Atlantic trade, and will ply between Boston, Mass., and Jackson, Fla. The Cramp Company have a large number of vessels in course of erection and completion, and all departments of the plant are kept uniformly busy and bid fair to continue so for some time to come.

The J. W. Paxson Company, foundry supplies, report a good demand, particularly for molding sand. The equipment for new foundry plants being extremely active. Among recent orders are to be mentioned: One 49-inch cupola and lining for the Nazareth Foundry & Machine Company; one 76-inch for the I. A. Sheppard & Co., Philadelphia; four 76-inch cupolas and lining for same for the Standard Steel Works, Burnham, Pa.; one 54½-inch cupola and elevator for the Acme Iron Foundry, Brooklyn, N. Y., and one of the same size and a Paxson Green blower for Avid, Platt Mfg. Company, Watervliet, N. Y. Abendroth Bros., Port Chester, Pa., have ordered a 76-inch cupola and a No. 6 Paxson Green blower, with direct connected engine. A 72-inch cupola and lining is to be shipped to Thomas Devlin & Co. for their new Burlington, N. J., plant; a 76-inch cupola is also to be furnished the Weatherly Foundry & Machine Company, Weatherly, Pa., and three 6000-pound capacity wall cranes have been ordered by the Clark Iron Foundry, Philadelphia, Pa., all the cupolas mentioned being of the Paxson-Colliar type.

The Baldwin Locomotive Works are exceedingly busy, the capacity of the plant being more than taxed. Inquiries and orders for engines are numerous, a recent booking being for 150 more engines for the Pennsylvania Railroad Company, making a total of 350 recently placed with the Baldwins by this company. The various improvements to the plant already mentioned in these columns is progressing satisfactorily. The new boiler shop is now being occupied, and will be entirely completed in about ten days. Some recent shipments of locomotives include six for the Central Railroad of Brazil, four of which are ten-wheel passenger and the other two switching engines. A narrow gauge compound engine has also been shipped the Mogiana Railroad of Brazil, while deliveries on orders of the Missouri, Kansas & Texas, Union Pacific and other railroads have been made.

In the recent New York-Boston automobile reliability run 75 autos started, but only 17 finished with perfect records. Of these three were Searchmont touring cars, which were awarded the gold medal of merit. The run was arranged for the purpose of testing the continuous running strength of automobiles. Only a certain distance was covered each day. The points were divided in 2,092, which was one for each minute of the time the autos were on the road. Three Searchmonts started, and each one came through the run without the slightest accident, delay or mishap, which is one of the most remarkable records ever established by an automobile. Every important maker was represented in the run. Each of the machines was 8 horse-power, and so complete were the workmanship and equipments that not one of the trio was penalized during the entire run. These machines are now being manufactured by the Fournier-Searchmont Automobile Company, whose extensive factories are located at Trainor, Pa.



## Trade Publications.

**Hendricks Commercial Register.**—S. E. Hendricks Company, 76 Elm street, New York, have just published the twelfth annual edition of Hendricks Commercial Register of the United States for buyers and sellers. It is especially devoted to the interests of the architectural, mechanical engineering, contracting, electrical, railroad, iron, steel, hardware, mining, mill quarrying and kindred industries. It contains over 1200 pages and 14,000 classifications, under which it is said there are 350,000 names and addresses. Its aim is to give the manufacturers of products made from the principal metals, clay, stone, marble, granite, slate, wood, fiber, asphalt, asbestos, &c. It also seeks to enumerate every kind of trade, machinery and tool employed in fashioning the above materials into the finished product, not omitting the professions that specify, as architects; the dealer who handles and the manufacturers and contractors who consume.

**Rainier Engines and Boilers.**—The F. E. Rainier Machinery Company, 153 South Jefferson street, Chicago, have issued an illustrated circular of their steam engines and boilers. Vertical engines of the center crank type, with throttling governor and governed automatically by an improved device contained within the fly wheel, are shown and described and features peculiar to their construction set forth. The engines are furnished on combined or independent bases. Attention is also called to their marine engine, which they claim to be a model of its type, and to two styles of horizontal engines, provided, as are the vertical type, with throttling governors or with the improved device within the fly wheel for regulation.

**Drilling and Milling Machines.**—The Aurora Tool Works of Aurora, Ind., in their catalogue No. 7, describe their drilling and milling machines. They make 20 sizes of upright drills from the 12-inch sensitive to the 80-inch radial. In their milling machines ball bearings are used on the table, feed screws and on the screw for elevating. The table is provided with quick return, has three slots, with all necessary clamp facilities, and has out channels and pockets in both ends. The range of feed is the greatest used in machines of these sizes and has 12 separate changes in the feed for every spindle feed, the changes being made by the operator while the machine is running.

**Drop Forgings and Furnaces.**—We have received from the Union Drop Forge Company of Chicago catalogues dealing with their drop forged mining drill parts, crank shafts, drop forged gas and gasoline engine parts, which are made so close to drawings that but a skin cut is required to finish the piece. Their furnaces for heating and melting use oil. The distinctive feature of this system of burning oil for forging, annealing, hardening, or for any purpose for which iron, steel, copper, aluminum or bronze is to be heated, consists in vaporizing the oil with a blast, the arrangement for doing which is complete in the burner. The blast is either furnished from a fan, blower or steam pipe. When the burner is used in connection with steam, the steam is furnished direct from the boilers. When the burner is used with air the blast is furnished through air pipes direct from the blower or fan, which is driven direct from the shaft by belt. By this system all units of heat in the oil are formed into gas and not stored, so that there is no lost heat. The company have just increased their equipment by the addition of two 2500-pound drop hammers, so that with the 40 hammers before in place they are in a position to handle anything in the drop forging line.

**Automobile Forgings.**—The Billings & Spencer Company of Hartford, Conn., have issued a pamphlet dealing with their forged automobile parts, many of which are carried in stock, while any form desired will be made to specifications. Their steering knuckles are drop forged of the best soft steel and are designed for light and heavy vehicles. Their C-207 steering knuckle and axle end is machined and fitted with a Premier "G" ball bearing automobile hub. The bearings are provided with hardened and ground tool steel cups and cones and have a positive adjustment that can be worked by removing the dust cap. The hubs are drilled for either straight or tangent spokes and are fitted with felt and leather washers, also dust caps. The upper end of the hub of the steering knuckle works on a fiber washer. The drilling of the eye in the arm of the steering knuckle and the drilling for the axle and spring lug in the axle end are left blank.

**Railroad Trucks, Cars, Sprinklers, &c.**—A very large and beautifully printed pamphlet has been issued by the McGuire Mfg. Company of Chicago, describing the railroad equipment built by them. Their motor truck has a solid steel frame, cushioned by spiral springs over each journal box, and is provided with a swing bolster on elliptic and spiral springs, mechanically proportioned. The motors are hung inside. It is machine fitted throughout, giving it great strength, and this, together with its simplicity, makes it the most durable and economical truck on the market. It has been adopted by leading elevated railway companies as a standard.

**Polished Steel Shafting.**—A catalogue from the Cumberland Steel Company of Cumberland, Md., deals with their turned and ground steel shafting. The introduction says: "Taking it for granted that turned shafting is the best, is there any difference in turned shafting? Any first-class mechanic knows that it is almost impossible to turn a shaft perfectly round or parallel, owing to the difference in metal, wear of tools, &c., and if he uses a file to make it true he does not succeed. When necessary to have a perfect surface, he will grind it. That is just what we do, and it is the difference between our shafting and that made by all other manufacturers." Shafting of this kind can be run at high speed without heating, is desirable for piston rods, and being true to size, couplings, gears, &c., can be fitted at less cost. It is made in sizes from 1 3-16 to 5 inches.

**Air Compressors.**—An elaborate catalogue by the Rand Drill Company, 128 Broadway, New York, describes their Imperial machines, which were designed to meet a demand for air compressors more automatic in their action than any yet built. While these compressors were placed on the market several years ago, their popularity has been so great that the company have designed new styles and sizes, and now build them for wide ranges in capacities and air pressures.

**Ship Machinery.**—A large catalogue by the Hyde Windlass Company of Bath, Maine, considers windlasses, capstans, steam tillers, steering and hoisting engines, pumps, &c. The materials used in the construction of these machines are those found by years of practical experience to be the most suitable and best adapted for such work, and are always of the best quality.

**Dynamos and Motors.**—A very handsome catalogue has been prepared by the Commercial Electric Company of Indianapolis, Ind., describing their dynamos and motors, both direct and belt driven, moderate and slow speed.

**Mining Machinery.**—The Hothoff Machinery Company, Cudahy, Wis., have issued a series of neat catalogues devoted to illustrated descriptions of the various classes of mining machinery which they manufacture. Section 1 is devoted to gold and silver milling and concentrating machinery; section 2 to boilers and sheet metal work, and section 3 to smelting, converting and refining machinery. Each section is provided with an index for ready reference. One of the effective features of section 1, from an artistic standpoint, is the introduction of frequent illustrations suggestive of mining life. From the standpoint of utility the catalogue is scarcely less conspicuous, illustrating and describing in a general way the principal machinery required for the reduction of ores by the various chemical and milling processes. In the preface to section 2 brief descriptions and salient features of types of standard boilers and articles of sheet metal construction are given. The company carry no boilers in stock, preferring to make boilers to order. They have but recently completed one of the largest and most complete boiler and sheet metal works in the West, equipped with modern tools and the latest improved appliances. Section 3 is devoted to illustrations and brief descriptions of the various types of standard furnaces for igneous concentration or smelting of ores, together with auxiliary machines and appliances used in such connection. Extensive experience in designing, roasting, smelting and converting plants and a practical knowledge of the requirements of each appliance entering into the construction of such plants enable them to furnish complete equipments, with close attention to economical operation as well as to securing best practical results.

**Engines and Compressors.**—The Nordberg Mfg. Company, Milwaukee, Wis., are inviting the attention of the trade to a consideration of the machinery which they manufacture through the medium of high class catalogues. One catalogue is devoted to the Corliss engine, the other to the Nordberg compressors. The general principles which make Corliss engine service desirable are first set forth, followed by the advantages of the special Corliss engine manufactured by the company. Nine different claims to superiority are set forth succinctly, followed by detailed description with sectional illustrations. Attention is given to the frame, the main bearing, the connecting rod, cross rod, piston, valve gear, regulator and safety stop, supplemented by pertinent remarks upon lubrication and proper foundation. Tables of dimensions and horse-power are appended. Space is also well given to a description of some special devices alone manufactured by this company. Some interesting observations on compounding and on tandem compound and cross compound engines are followed by pertinent remarks and distinctive illustrations of condensers and feed water heaters and purifiers. But the constructive principles of the various types of compressors manufactured by this company are set forth more fully in a separate catalogue devoted exclusively to this class of machinery. The company note that while they have made several radical departures from common practice and new mechanisms designed to meet peculiar working conditions and new types heretofore untried in compressor practice, in no instance has there been any cause for complaint, but every new feature introduced from time to time has proved a step forward in economy of air compression.

# HARDWARE.

**M**ORE than one moral is to be drawn from the recent drop in the price of Shovels and Spades, especially as the situation foretells the story of what may be expected in many of the large combinations. It has been evident for a long time to every close observer that the association owed it to themselves and for the protection of their loyal customers to discard their plan of ignoring outside competition and to make such prices on Shovels and Spades as to show them to be distinctly in the game. This they have now done with an emphasis which leaves no doubt in the minds of the trade of their purpose to maintain their position as the leading manufacturers of the goods in question.

The outside competition had indeed grown so strong, so clamorous and so insistent that it was folly any longer to ignore it. It also occurred to those who judge events from analogy and experience that the only course to pursue was a radical one—that the cut in prices to be effective must be as deep as a well and as wide as a church door. It seems also a simple proposition that whatever was to the interest of the association must, in the long run, be to the interest of its loyal customers. Any expediency, any temporizing, any sacrificing of the future to the present could only be shortsighted and productive of harm.

It seemed a logical conclusion that the cut should come immediately, but there is much criticism of the manner in which the reduction was put into effect, especially the announcement of it a month in advance of its operation. Pressure, however, seems to have been brought by many jobbers on members of the association to postpone this reduction in order that the stock in the hands of the jobbers might be reduced, overlooking the very obvious fact that if a cut was made to take effect at a future date the knowledge of such cut would at once become common property, despite all plans and regulations to the contrary. It was manifestly absurd to expect any one to pay high old prices for a period of 30 days when it was generally known that new reduced prices would be in effect at the end of that time. In addition to this it would have been poor business for merchants to unload their stocks under such circumstances on their unsuspecting customers. *The Iron Age* and some of the large jobbers promptly recognized the situation and gave the information to the trade. These broad minded jobbers, in effect, said to their customers that they could not and would not support such a plan, that it was not to their interest to load up the retailers with Shovels at old prices, that they would rather bear the loss themselves and thus keep the good will and good opinion of their customers. Indeed it is difficult to understand how any one could, for a moment, entertain an idea that the plan would be effective and satisfactory. Of course, the expected happened; the new prices went into effect immediately upon publication, and the futility, the shortsightedness and the unwisdom of the whole plan became at once apparent.

The association all through their history have been influenced largely by what they regarded as for the interests of the jobbing trade, sometimes even, it has seemed, to the detriment of the retail merchants, and it is understood that the manner in which the reduction in question was made was determined upon in the same spirit.

Instead, however, of being received with appreciation it is very generally criticised and condemned by the very class of trade whose interests have been constantly served by the association. The consideration shown to their large customers, for whose benefit the decline was announced in advance, and the manner in which Shovels have been for years rendered a profitable line to the jobbers, should, however, not be forgotten at a time when the association found it necessary to make a radical reduction in prices. Dissatisfaction and loss to those who had stocks of Shovels on hand were the inevitable results of its policy, and too much criticism should not be expended upon the way in which a descent was made to a reasonable level of prices.

In connection with the result of the operations of the Shovel Association much interest attaches to the progress that is making toward the organization of an important consolidation which, if effected on the lines laid down, will become a dominant factor in the production of Axes and Edge Tools. If the plans to this end are carried out there will be for the trade an opportunity on the one hand to reflect upon the failure of one association to control the market and its success in building up most troublesome competition, and on the other to contemplate a much larger and more important consolidation which will enter upon its career also practically supreme in the lines which it covers. There cannot fail to be conjecture in the minds of the trade as to what its history will be—provided present plans are consummated—and whether it will repeat in a new form the old story of a shortsighted policy and ultimate disaster. Those prominently connected with the new consolidation disclaim any such intention and encourage the trade to hope that its management will be conservative and in accordance with sound business principles. The combined interests have certainly a multitude of examples of similar organizations, most of which will best serve them as warnings of mistakes into which there is danger of their falling.

## Condition of Trade.

The influence of the engrossment of the public mind in political matters in connection with the election was felt to a moderate extent in business, which notwithstanding this influence continues in large volume. The market is feeling the effect of the lower prices ruling in several leading lines and a few which are under a certain degree of suspicion as likely to develop weakness. The recent reductions in prominent staple goods are, however, well received by the trade, and do not cause anything like a general distrust of the market, although for the time being their tendency is to check business slightly. There continues to be a steady movement of goods to replenish stocks of retail merchants and jobbers generally are very busy and still find difficulty in getting goods promptly. In spite of the neglect of foreign markets by some manufacturers there is a large volume of export business, among which Hardware articles have a large and growing place. In several lines in which American products had comparatively little sale abroad there has been on the part of the manufacturers within the past year or two an energetic cultivation of foreign markets with most satisfactory results. The announcement made in another column of some of the details of the projected consolidation of Axe and Edge Tool interests will be read with interest as relating to a carefully directed effort to put the lines in question on a firm and uniform basis.



**Chicago.***(By Telegraph.)*

Probably the most interesting, if not the most important, feature of the week has been the trade war developed in Strap and T Hinges, both manufacturers and jobbers being actively interested in the keen competition which has resulted in a drop of 10 per cent. in prices of these goods within the past ten days. Some jobbers have been quick to avail themselves of the situation and have purchased in carload lots, even on top of a full stock, but small buyers, as is usually the case, are disposed to hold off when they find prices declining. Other departments of Builders' Hardware are well sustained, not sympathizing with the unusual condition in Strap and T Hinges, and the demand is unusually prolonged, the present weather stimulating building operations. There is some little call upon manufacturers for goods for next year's delivery, but no contracts for appreciable amounts have been placed recently. Another interesting event of the week is the pushing of sales of Shovels, lower prices being made by jobbers in anticipation of the decline which will take place on combination goods November 15. Jobbers seem to have been more than usually successful in their efforts to dispose of their stock of both open back and plain. There has also been a fair distribution of Scoops, which are, of course, better sustained than Shovels. There has continued to be quite a brisk trade in Skates, Toys, Pocket Knives, Carvers, Shears and other Cutlery for the holiday trade, and also quite a liberal movement in Axes, Lanterns, Stove Boards and Stove Pipe, as well as a general line of Shelf Hardware. The sale of Carpenters' Tools has continued unusually brisk. It is notable that manufacturers of Oil Heaters continue to receive quite a number of urgent orders, notwithstanding the heavy business transacted during the past few months, October being probably the largest this line of trade has ever experienced. The settlement of the Anthracite Coal strike and the distribution of Coal following seem to have had little effect in curtailing business in Oil and Gas Heaters. Jobbers continue to report that they are still gathering moderate sized orders for Wire Cloth, Poultry Netting, Mowers, Refrigerators and such classes of goods for spring delivery. Manufacturers of Saws note continued activity in orders, including Cross Cut Saws, which are again increasing, notwithstanding that some factories are away behind in the filling of old contracts. Manufacturers of Washing Machines and Wringers report an increased distribution of their goods, especially in the Central and Northwest. The demand from the South is still notably lacking, there being a prejudice, it is claimed, against such innovations in that territory. Manufacturers' agents for Coffee Mills and Enamelled Ware report a continued receipt of important orders, but Wire Goods are less active. The volume of business in Heavy Hardware is said to be increasing, but the scarcity of large Flat and Round Bars, especially the latter, is responsible for a less active movement in this line. There is a good demand for Horseshoes and a fair inquiry for other Blacksmiths' and Wagon Supplies. A report is current in regard to a reduction in Tin Plate to \$3.60 per box.

**St. Louis.***(By Telegraph.)*

The dealers continue their liberal demands on the jobbers, and the opening of the new month from the trade standpoint looks most encouraging. The jobbing houses generally placed increased forces of salesmen on the road this year, and the great energy these men individually are putting in their work shows in the fine results achieved in the opening up of new territory, and increased sales in the old territory. The scarcity in many lines of goods which has been noted here and at other points is still the one unpleasant feature in the situation. Signs of the beginning of preparation for early spring demands are apparent, and in certain spring specialties the movement is a steadily increasing one. Prices are firm, and with few exceptions in good shape.

**San Francisco.**

**PACIFIC HARDWARE & STEEL COMPANY.**—The decline in Shovels, as announced by the Shovel Association, has

been the general topic of conversation among the trade of the Pacific Coast. While this had been anticipated for some time, the reduction as made was greater than was expected and worked quite a hardship on the trade of the Pacific Coast, as they are compelled to carry a heavy stock on hand in order to meet the wants and demands of their trade, being so far away from the basis of supply.

The winter season has just commenced with us, and it has been raining steadily for nearly a week, making the farmers feel very jubilant, as it has come to us at just about the right time.

Trade conditions are good on the coast, demands for nearly everything in the Hardware line being fully up to date, if not more than the trade of last year. The feeling among the trade is that this year will surpass last year in the volume of its business.

**Nashville.**

**GRAY & DUDLEY HARDWARE COMPANY.**—The month of October showed a larger volume of business than October last year and November is starting out in fine shape. The movement of all seasonable goods is very heavy, including such lines as heating Stoves, Stove Boards, Stove Pipe, Coal Hods, &c. The sale of holiday goods is also large at this time and retail dealers seem to anticipate doing a larger Christmas business than for some years past, and we believe they will not be disappointed in this as the general masses of people in this section of the country are in better shape than for a long time. They have more ready money than usual and are pretty apt to spend it during the Christmas festivities.

The credit men of the different local houses report their departments to be in good shape. The general condition of the market seems to be very healthy, indeed, the demand for all classes of merchandise being enormous and prices well maintained.

**Philadelphia.**

**SUPPLEE HARDWARE COMPANY.**—Trade during the last week has been exceedingly good in wholesale trade circles. Most kinds of Hardware have been in active demand and have contributed to the result. Season goods have been in active demand, and owing to the scarcity of coal, Oil Stoves and Gas Radiators have been called for far beyond the ability of either the manufacturers or jobbers to furnish. The resumption of coal mining through the miners going back to work depending upon the results of arbitration has been a most happy settlement of the vexed question, which has not only caused depressed trade, uneasiness and anxiety, but if delayed much longer would have caused sickness, distress and death from lack of coal for heating purposes. Collections are fair.

**Omaha.**

**LEE-GLASS-ANDRESEN HARDWARE COMPANY.**—The month of October, just closed, has been characterized by a very satisfactory business throughout, and we doubt if it has ever been equaled by any corresponding month for volume and value. All kinds of goods are moving very freely, and both jobbers and manufacturers have about all they can attend to.

Collections may be reported as satisfactory, indicating that retailers are enjoying a good cash trade. The West is not a borrower of money to the extent it has been in former years, not that enterprises have stopped by any means, but from the fact that the entire Western country is in a much more healthy condition financially than it ever has been.

**Cleveland.**

**THE W. PINGHAM COMPANY.**—The Hardware business in this section continues very good; stocks seem to be light all over the country and merchants are sorting up quite freely.

We have nearly caught up on our back orders for fall goods—viz., Stove Boards, Elbows, Sheet Iron, &c.—and customers are now sending us sorting up orders for these same lines and many other fall goods. On the whole

business is quite satisfactory and we are looking forward to a good trade the balance of the season.

On some lines of goods the manufacturers are still behind and are not able to carry out the promises of shipment they make from time to time. This makes it quite unpleasant for the jobber who has orders for some kinds of goods from his customers and is not able to complete the orders as fast as he would like. The large demand for goods embraces such a great variety that it is impossible to serve every one as promptly as we should like. However, this scarcity of goods is not confined to any one section of the country, but seems to be universal. Collections are quite satisfactory.

## NOTES ON PRICES.

**Wire Nails.**—The Wire Nail market appears to be in better condition than for some time past. A firm tone prevails, and reports are to the effect that prices are maintained. A large demand exists, as buyers have evidently regained confidence in the market. Quotations are as follows:

Jobbers, carload lots.....	\$1.85
Retailers, carload lots.....	1.90
Retailers, less than carloads.....	2.00

**New York.**—Local demand is good, and is likely to continue so until there is a change for the worse in weather conditions. Some of the trade tributary to this point are considering the advisability of contracting for deliveries after the first of the year. Quotations are as follows: Single carloads, \$2.05; small lots from store, \$2.10 to \$2.15.

**Chicago, by Telegraph.**—The largest manufacturers in the market have experienced quite an active demand throughout the central and western sections of the country, and even the South has been buying more liberally recently. Apparently stocks in the hands of jobbers are inadequate, as urgent letters and even telegrams are received asking for prompt shipment. The market has been slightly ruffled by reports of lower prices, but investigation seems to indicate that such reports have little foundation. Official quotations remain steady on the basis of \$2 in carload lots and \$2.10 in less than carload lots. In lots of 1000 kegs or more some sales have been made at \$1.95, Chicago.

**Pittsburgh.**—Considerable improvement in demand in Wire Nails is reported and the general condition of the market is better than for some time. There is more stability in prices and mills report that there is an entire absence of concessions, fixed prices being strongly adhered to. The high prices of Steel Rods will undoubtedly force a number of small Wire Nail concerns out of the market that have to buy their raw material. It is impossible to pay present prices of Rods, which are about \$36, Pittsburgh, and convert them into Nails and sell them at present prices and come out whole. For this reason the Wire Nail trade is likely to be centered in the large concerns that have their own supply of Steel and their own Rod mills. Wire Nail manufacturers confidently expect a large fall demand. We quote Wire Nails at \$1.85 to \$1.90 in carloads, and \$1.95 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg extra is charged and for finning Nails \$1.50 per keg extra.

**St. Louis, by Telegraph.**—Wire Nails continue in fair call from the jobbing trade. The quotation of \$2.15 in small lots from store is generally maintained, but on transactions of larger volume quotation is variable.

**Cut Nails.**—The demand continues good. There are complaints made that it is difficult to obtain even Steel Cut Nails in the quantities required. The opinion is expressed by the well informed that the call for Cut Nails is gradually increasing in volume. Quotations are as follows: \$2.05, base, in carloads, and \$2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

**New York.**—The Cut Nail market remains firm at this

point with a steady demand. Quotations for carloads and less than carloads are as follows:

Carloads on dock.....	\$2.18
Less than carloads on dock.....	2.23
Small lots from store.....	2.30

**Chicago, by Telegraph.**—There has been a fair current consumptive demand, trade as usual being of a conservative character. Prices have been well sustained, sales being made mainly at \$2.15 in carload lots and \$2.20 to \$2.25 in less than carload lots, base, Chicago.

**Pittsburgh.**—There is a fairly good demand for Cut Nails, and the leading mills are well filled up with orders and are running to full capacity. There is still some difficulty in getting prompt deliveries. Iron Cut Nails bring about 10 cents advance over Steel. We quote Steel Cut Nails as follows: \$2.05, base, in carloads, and \$2.10 in less than carloads, plus freight in Tube Rate Book to point of destination, terms 60 days, less 2 per cent. off in 10 days.

**St. Louis, by Telegraph.**—The volume of demand for Cut Nails is small, and the quotation for small lots from stock remains at \$2.30.

**Barb Wire.**—There is increased liberal buying in some sections of the country, which results in a more satisfactory volume of business. The market is firmer at the reduced prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

**Chicago, by Telegraph.**—Some liberal orders have been received from various sections, especially from the West, by the largest manufacturers, business being more than usually active at this season. Otherwise trade has been without interesting feature and the market has remained steady for Galvanized at \$2.60 in carload lots and \$2.70 in less than carload lots, and Painted at \$2.30 in carload lots and \$2.40 in less than carload lots, Chicago.

**Pittsburgh.**—In certain sections there is a fairly good demand for Barb Wire, but the general condition of this trade is quiet. Specifications on old contracts are coming in fairly well. However, the trade continues to buy mostly in small lots. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount off for cash in 10 days: Painted, \$2.15; Galvanized, \$2.45, in carloads; less than carload lots, Painted, \$2.20; Galvanized, \$2.50.

**St. Louis, by Telegraph.**—No increase is to be noted in the volume of demand for Barbed Wire and the present movement continues on a limited scale. In small lots jobbers quote Painted at \$2.50 and Galvanized at \$2.80.

**Plain Wire.**—There is a decided improvement in demand, and prices are referred to as being firmly held. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.75
Retailers, carloads.....	1.80
Less than carloads.....	1.90

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	Plain.	Galv.
6 to 9.....	Base.	\$0.30
10.....	Advance over base.....	\$0.05
11.....	" " " " " " " " " " " "	.10
12 and 12½.....	" " " " " " " " " " " "	.15
13.....	" " " " " " " " " " " "	.25
14.....	" " " " " " " " " " " "	.35
15.....	" " " " " " " " " " " "	.45
16.....	" " " " " " " " " " " "	.55
17.....	" " " " " " " " " " " "	.70
18.....	" " " " " " " " " " " "	.85

**Chicago, by Telegraph.**—There has been a fair movement on previous contracts and moderate current order trade, the market remaining steady for carload lots on the basis of \$1.90, and less than carload lots at \$2 from store, Galvanized bringing 30 cents extra. There has been a fair movement in Staples, which have sold at



\$2.05 in carload lots and \$2.15 in less than carload lots, Chicago.

**Pittsburgh.**—There is a fair demand, the tone of the market being firm. We quote Plain Wire at \$1.75 to \$1.80, base, for Nos. 6 to 9; Galvanized, 30 cents extra for Nos. 6 to 14, and 60 cents extra for Nos. 15 and 16.

**St. Louis, by Telegraph.**—The market for Plain Wire shows steadiness, but any marked increase in demand is lacking. No. 9 is sold at \$2.10 and Galvanized at \$2.40 in small lots from store.

**Strap and T Hinges.**—The extent to which new manufacturers have been entering the market is assigned as the principal reason for some irregularity in the prices of these goods. There are several manufacturers who have been gradually making a place for themselves, and their influence is felt to some extent by the manufacturers of recognized position.

**Shovels and Spades.**—There continues to be a good interest on the part of the trade in general in regard to the prices of the associated manufacturers, to go into effect November 15. In anticipation of this event the jobbing trade generally are making material concessions in their prices on these goods and endeavoring to dispose of their stocks on hand even though at a loss. The action of independent manufacturers is awaited with interest. The trade are curious as to whether or not they will be able to meet the low prices of the association and are also speculating as to whether the competition for business is to drive prices to a still lower figure.

**Cordage.**—The Rope market is about in the same condition as last week, and is considered favorable, taking into consideration the high prices and the season. According to maker and quality of goods, quotations are as follows: Manila, on the basis of 7-16-inch and larger, 12¼ to 12½ cents per pound; Sisal, on the same basis, 9¼ to 10 cents per pound. These quotations might be shaded slightly on desirable orders.

**Glass.**—Demand continues light in the local market, and little effort is being made to force sales. In some cases it is understood regular quotations are not strictly adhered to. The Jobbers' Association quotations are as follows for single and double strength Window Glass:

From store .....	Discount.
F.o.b. factory, carload lots.....	88 and 5 %
	89 and 5 %

**Paints and Colors.**—The quantity of White Lead in Oil which is being used is still large. Buyers are confining their orders to present requirements so as not to have stocks on hand when inclement and cold weather comes. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

**Oils.**—**Linseed Oil.**—The tendency of a downward movement in flax seed prices deters buyers from purchasing larger quantities of Linseed Oil than they need for present requirements. As lower prices are anticipated there is no inducement to place contract orders for future delivery. A good demand exists for spot Oil in small lots. City Raw is quoted, according to quantity, from 46 to 47 cents per gallon. State and Western brands are quoted, on the same basis, from 43 to 44 cents per gallon.

**Spirits Turpentine.**—Prices at this point have advanced slightly during the week, as a result of increased buying. Quotations, according to quantity, are as follows: Southern, 54½ to 55 cents; machine made barrels, 55 to 55½ cents per gallon.

### NEW BRITAIN NOTES.

P. & F. Corbin, New Britain, Conn., are making extensive changes in their plant, in order to increase their output. They have just completed a large seven-story fire proof building to be used for general manufacturing purposes, and are now at work on a new foundry building to be 60 feet wide and 600 feet long, located on their property at the annex adjacent to the tracks of the New York, New Haven & Hartford Railroad. It is expected that the building will be ready for occupancy by January 1, as the mason work is now practically completed. These improvements will necessitate the em-

ployment of 100 additional iron molders, 70 brass molders and 500 extra help in general manufacturing.

The Russell & Erwin Mfg. Company, New Britain, Conn., have placed the contract with B. H. Hibbard for the construction of a new manufacturing building to be 50 feet wide, 200 feet long and seven stories high. The construction will be fire proof throughout and the floors will have a capacity of 250 pounds per square foot, so that the building can be used for carrying all classes of manufactured goods. It is expected that this building will be completed and ready for use about February 1.

### THE INTERNATIONAL AXE & TOOL COMPANY.

THE negotiations which have been going on for nearly a year, with a view to forming a consolidation of the manufacturers of Axes and certain lines of Edge Tools, have reached a point where final action is about to be taken in regard to the project. The movement is under the direction of Charles E. Locke of New York City, who has called a meeting to be held to-morrow (Thursday) of the representatives of the following concerns, together with others, this meeting being preparatory to the organization of a new company, which is to be known as the International Axe & Tool Company:

AMERICAN AXE & TOOL COMPANY, NEW YORK.  
 KELLY AXE MFG. COMPANY, ALEXANDRIA, IND.  
 MANN EDGE TOOL COMPANY, LEWISTOWN, PA.  
 JAMES H. MANN, LEWISTOWN, PA.  
 ROMER AXE COMPANY, DUNKIRK, N. Y.  
 WARREN AXE & TOOL COMPANY, WARREN, PA.  
 STANDARD AXE & TOOL COMPANY, RIDGWAY, PA.  
 UNITED STATES EDGE TOOL COMPANY, CATTARAUGUS, N. Y.  
 INDIANA EDGE TOOL COMPANY, GAS CITY, IND.  
 FAYETTE R. PLUMR, INCORPORATED, PHILADELPHIA, PA.  
 IRON CITY TOOL WORKS, PITTSBURGH, PA.  
 WARWOOD TOOL COMPANY, WHEELING, W. VA.  
 PECK EDGE TOOL COMPANY, COHOES, N. Y.  
 NORTON TOOL COMPANY, CLEVELAND, OHIO.  
 WINSTED MFG. COMPANY, WINSTED, CONN.  
 EAGLE SCYTHE COMPANY, WINSTED, CONN.  
 TURNER, DAY & WOOLWORTH HANDLE COMPANY, LOUISVILLE, KY.  
 SOUTHERN HANDLE COMPANY, HUNTSVILLE, ALA.  
 DUNN EDGE TOOL COMPANY, OAKLAND, MAINE.  
 DAVID WADSWORTH & SON, AUBURN, N. Y.  
 INDEPENDENT STONE COMPANY, CLEVELAND, OHIO.  
 KLEIN-LOGAN COMPANY, PITTSBURGH, PA.  
 CENTRAL TOOL COMPANY, JONESBORO, IND.  
 EVANSVILLE TOOL WORKS, EVANSVILLE, IND.  
 WELLAND VALE MFG. COMPANY, ST. CATHERINES, ONT.

It is understood that the above parties as well as others have given options on their plants, the terms of some, at least, of these options being still held under advisement. The scope of the operations of the new company and the advantages which it will secure are in general indicated in the names of those whose interests are united in it. It will be observed that beside consolidating the plants of the leading manufacturers of Axes, Hatchets, Scythes and other Tools, prominent manufacturers of Handles and Grindstones are a constituent part of the company. We understand also that some steel manufacturers will probably be identified with it, from whom the company can obtain their raw material. In this way, being in a position to supply their requirements practically at cost and at the same time to effect economies in administration, the company can produce goods very advantageously and will not be under the necessity of forcing prices up to an unreasonable level. They, in fact, disclaim the intention of advancing prices generally, though it is probable that some necessary readjustments may be made. It is intended that the management of the company will be on conservative lines, and that in connection with the supply of the home market there will be an earnest and energetic effort to secure a largely increased trade in foreign markets.

A Long & Son are about to open a new Hardware and Furniture store at Evergreen, Ala.

L. J. Zimmer has bought the Hardware stock of H. S. Mason & Son, Altoona, Iowa.

## PAINTS IN THE HARDWARE STORE.

BY H. C. W.

**T**HE consensus of opinion among the larger and better class of Hardware merchants seems to be that Paints have their place on our shelves. The subject has been one of interest for years and has been discussed at nearly every State Hardware Association meeting. There have been papers and discussions innumerable as to profits and plans and methods of handling, but always the general feeling and decision that in the end they are profitable and legitimate stocks of Hardware.

There was a time not so many years ago when the bulk of the trade in many cities and towns was confined to the druggist. This is true to a certain extent in some sections in this day. This was true also in earlier days of the Glass business, and yet neither one of them is in any sense largely allied to drugs.

### Changes of Time

have brought so many new and varied lines to the doors of all classes of merchants that it seems foolish to hesitate at adding anything to Hardware that may have profit, immediate or prospective. The department store, the variety store and the catalogue house are now all competitors and must be met as such, whether with Paints, Nails, Pins or what not. It's a case of live and do the best you can, and the day is at hand when customers expect to find a little of everything within your doors, and we must meet their expectations or our neighbor most certainly will.

### Objections to Handling Paints

are frequently made, because of close figuring and uncertain settlements of many contractors to whom the goods are sold. The writer firmly believes that if the painter contractors in his vicinity are not of the best reputation it is not necessary to sell them, and it is easy to do a nice business direct with the owner. This is extremely desirable at any rate in States like our own that are without an effective lien law. It is true in nearly every case that the owner of the building can be sold such goods in a thoroughly satisfactory way. More than this, there is a nice trade always in such lines separate and distinct from the contractor. Another objection offered frequently is that there is not sufficient profit in Leads and Oils to justify their handling, but it is

### Not Leads and Oils

that we look to for the profits. It is the kindred and other lines that go with them. What other line have you in your house that shows the profit coming from small box Paints, from Stains, Varnishes and Enamels, from Crayons, Marking Inks and the thousands of smaller size Brushes that every woman buys? The Brush trade all the way through is considered profitable and is a large part of Paints, Oils and Varnishes. Then there are Dry Colors of all kinds, with little invested and a good profit coming from them. Fillers, Lacquers and Varnishes always bring a nice return, particularly in small packages. The business is much like any other in that

### Judgment Must Be Used

and judgment of the best kind, in the buying and placing of stock, in the brands of goods bought, in the quantities needed. The temptation to overbuy, particularly in Mixed House Paints, is always great, but can be avoided with a little care. It is much easier to fill the shelves often, get the goods quickly, than to pay for goods unsold. Then fresh Paints and new colors are much to be desired. A small stock grows as the trade grows, which is better than a continual sacrifice to cut the stock down. Good judgment in the Brush and Box Paint department will let it turn itself often and with as good profit as any other line handled by the Hardware merchant. If it is necessary to sell the larger and less profitable goods to a contractor, then every job when it is on the house should pay for itself and it should be some one's duty to see that it should pay. There are

### Weak Points in the Business

as there are in any and all other kinds of traffic, and it is these errors in the business that have so often led to discouragement. First and worst are the losses so many times complained of, and they must and can be taken care of, if in no other way, by making a cash business of the Paint department—and that can be done.

Buying cheap brands of Lead for profit's sake is an error; handling unknown and worthless brands of Brushes that go to pieces on your sidewalk; being persuaded into buying 10-cent box Paints that are utterly worthless; selling Linseed Oil substitutes for the genuine; handling cheap and inferior Dry Colors; all these errors will start trade quickly enough, but it departs in even less time. If there is one line in the business that requires sterling brands and high quality it is this one. While the profits may not come as quickly, your reputation for good goods will. Men will hunt everywhere for pure Paints, and the average one will pay the price to get what he wants.

### What Stock Is Needed

depends largely on conditions—location, extent of territory, experience and capital that can be spared. A large stock is not necessary under any conditions. Where Paints and Oils are handled, a small one is to be preferred. Many stores begin with a small line of ready mixed Paints in gallons, half gallons and quarts of each color decided on, and add to this a few dozen of box or ½-pint size of all staple colors. These are called for every day in the year. Varnish Stains are put up in the same sizes and need be staples only, such as Walnut, Cherry, Oak, Mahogany and Rosewood. This leaves out the less profitable White Leads, lines of which may be added as the trade increases. It is necessary, of course, even with a small assortment, to carry Linseed Oil in stock. To the above should be added a small but good assortment of Brushes, that sell all the time. The smaller sizes—1, 1½, 2 and 2½ inches—yield a nice profit, are staple, and should be carried in at least two qualities, one line, say, at 10, 15, 20 and 25 cents and the other at 15, 25, 35 and 50 cents. A medium line of 3, 3½ and 4 inch Wall Brushes of good make will make a fair start for a small business. You will find the stock constantly expanding.

### Keep Stock in Front,

particularly in the early days of the venture, and it's the best place at any time. No line of goods does as much of its own selling as Paint stock attractively arranged. You may pile it up promiscuously in an obscure part of the store, and you'll have it on hand till doomsday. On the other hand, in neat light racks, arranged as shelf goods against the wall or counters, or in a central floor rack of its own, it's half sold before you know it.

In selecting both House and Box Paints have the makers furnish you plenty of color cards of both classes covering your selection only. It is needless to say they, too, should be at the front, go out in your mail occasionally and be wrapped up with packages going out.

### A Large Stock

requires, of course, still more attention, much preparation, continual watching of stock in season, a considerable outlay of money and eternal vigilance. We have had an experience of a good many years, carrying everything in the line, and have always found it as profitable as any other line and more so than many. Where one goes into it in a large retail way, or grows into it as we have, it means a ton or two of Lead on the floor at all times, several barrels of Oil always at hand, 25 to 40 bins holding each a color of Mixed Paints in gallons, halves and quarts, 400 to 500 cans of box goods in Colors, Enamels, Stains, Colors in Oil and Japan, Carriage Colors, and the hundred and one small goods that are added, such as Aluminum Paints, Gold and Silver Paints, Bronzes, Top Dressings, Striping Colors, &c.

### Dry Colors and Brushes

must of course be a part of such a stock, the Dry Colors in barrels in your cellar and the Brushes (which repre-



sent quite an investment when well selected) in a case, either wall or floor, built especially for their accommodation and sale. The Dry Colors can be confined to Ochres, Venetian Reds, Metallic Reds and Browns, Lamp Blacks, Whiting, Pumice Stone, ground and in the lump; Fillers, Lump Chalk, &c.

Your trade will indicate what your Brush stock should be. Every painter will suggest a different brand of Brushes, but it's a good idea to confine one's self to a sterling and well-known brand, and in nine cases out of ten it will sell. The stock should be well kept up and well assorted, as it's hard to sell a customer Paint who won't buy your Brushes. The sizes named before are hardly sufficient, as larger sizes in small quantity are needed—i. e., 4½ and 5 inch Wall, to which must be added a few Ovals, with Painters' Dusters, Paper Brushes, Fitches, Strippers, Stencillers, Marking Brushes of all sizes, Camels' Hair in 1, 1½, 2 and 2½ inch, Glue and Paste Brushes, and there will be others in time.

#### Varnishes

form quite a part of the stock, being quite profitable and of ready sale, particularly when put up in gallons, halves, quarts and pints, displayed attractively and kept well to the front. A Varnish stock can be anything you choose to make it, but it is well to carry staples and avoid fancy and high priced stock until asked for. In nearly every case your customer will wait for you to order it, and you have the assurance of its being sold when it comes to hand. It is necessary to carry ordinary Coach, No. 1 Coach, Extra No. 1, Hard Oil Finish, some Rubbing, a good Surfacers, and all this with what has gone before will make a pretty complete Paint stock in which to make a profitable investment.

#### REQUESTS FOR CATALOGUES, &c.

*The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.*

L. W. Gunby, wholesale and retail Hardware, &c., Salisbury, Md., is on the market to place stock order for Crate Hinges and Corner Irons; also Basket Tacks and Nails. Mr. Gunby states that he supplies Southern veneer factories with large quantities of the above goods, and will be pleased to receive quotations and samples from manufacturers.

John Weekes has severed his connection with the Hunting-Weekes Company, Watertown, N. Y., jobbers of plumbers' and steam fitters' supplies and tools, and has embarked in the same business under his own name. Mr. Weekes has under construction at the present time a modern building with all the necessary equipment to carry on a jobbing business on a large scale. The building will be a four-story structure, 200 feet long, equipped with power, elevators, and having connection with the New York Central & Hudson River Railroad. He will carry a full line of Plumbers', Steam Fitters' and Tin-smiths' Supplies and Tools, Tinware and Enameled Ware. A large pipe cutting and threading machine, run by electricity, will be installed in the building. Mr. Weekes has been in the jobbing business for years past, and has considerable experience in this line. He will be in position to supply the trade in a few months, and at the present time desires manufacturers in the different lines noted above to forward catalogues and other printed matter.

The Davis Hardware Company have opened up a new Hardware store in Williamsport, Ohio. They are desirous of securing catalogues and other printed matter relating to Shelf Hardware, Farm and Garden Tools, Tinware, Stoves, Lamps, &c.

Two very effective window displays were recently made by Hardware houses handling the Gem Food Chopper, manufactured by Sargent & Co., 149-153 Leonard street, New York. One display, that of Norris & Loring Hardware Company, Cedar Rapids, Iowa, represented a cloth covered table on which were plates of various kinds of food cut by the Gem Chopper, with

the Choppers and Cutters appropriately placed, in the rear of which were many kinds of food products susceptible of being chopped by this machine, while at one side was a bright faced miss of 8 or 9 years operating one of the Choppers. The other display was made by W. K. Morison & Co., Minneapolis, Minn., occupying the whole window front, the show taking the form of an easel with Choppers all around the edges and distributed about in front of it, there being a table in the center of the easel containing a Gem Chopper and various kinds of chopped food.

#### MOSSBERG WRENCH COMPANY.

**M**OSSBERG WRENCH COMPANY, H. H. Ricker, manager, formerly located at Attleboro, Mass., are now located at Central Falls, R. I., where they occupy a new brick factory especially designed for their work and located on the line of the N. Y., N. H. & H. Railroad. The building is of brick, two stories high, and has 33,000 square feet of available floor space. The Mossberg Wrench Company will continue the manufacture of their well known line of Bicycle Wrenches, Automobile and Bicycle Bells, Steel Manicure Fittings, and Novelties to order. Already some new equipment has been added, but it is expected that additional machinery for special work will be ordered later. The factory is now completely equipped for producing sheet metal stampings and doing light machine work and with their added facilities the company expect to give more attention to manufacturing specialties to order and doing experimental work. Electric power is used and there are complete nickel plating and polishing departments. We are advised that the Mossberg Wrench Company are not connected with any other concern bearing the name Mossberg.

#### OFFICIAL CHANGES IN THE DE WITT WIRE CLOTH COMPANY.

**T**HE death of Francis J. Bartlett at his home, Beverly, N. J., October 16, aged 64 years, and who since 1885 had been president and general manager of the De Witt Wire Cloth Company, has made necessary some changes in the executive staff of the company. The office of president was recently filled by the choice of Robert Rogers of New York, who has been a large stockholder and director of the company for many years. At the same meeting of the directorate John G. Miller, who has been the company's secretary, was also elected general manager and hereafter will discharge the duties of both offices, dividing his time between the factory at Belleville, N. J., and the branch offices in New York and Philadelphia, a large part of it being devoted to the New York office, of which Mr. Miller has had charge for some years.

THE BURHANS & BLACK COMPANY, Syracuse, N. Y., have lately purchased considerably more than one-half of the stock of the Syracuse Hardware Company. The latter company are one of the oldest firms in Central New York, and were formerly known as Kennedy-Spaulling Company, then as Kennedy Sons & McGuire, who were succeeded by the Syracuse Hardware Company. It is believed that under the new conditions the interests of both concerns will be largely advanced. Owing to diminished expenses, reduction of capital and the combined experience of both firms, it is expected that the customers of both companies will be largely benefited by the change. There probably will be no changes so far as travelers and employees are concerned, as it is thought there will be room for all.

IN announcing in our last issue the change in the name of the Chattanooga Steel Roofing Company, Chattanooga, Tenn., the word Roofing should have been used instead of Manufacturing, as the new style is Chattanooga Roofing & Foundry Company. This company manufacture a large line of Sheet Metal Goods in addition to Steel Roofing, and also conduct a large foundry, so that a more comprehensive name was desirable.

## NOTES ON FOREIGN TRADE.

### BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE,  
NORFOLK ST., LONDON, W. C., Oct. 25, 1902.

#### The Economic Condition of Ireland.

**T**HERE are many reasons why American exporters should make themselves acquainted with the present economic and commercial position of Ireland. Although it lies close to England, its people are nevertheless more nearly in sympathy with American habits of thought; indeed, three-quarters of the Irish population dislike the English, and subject to certain special conditions would rather buy from Americans than from Englishmen. The difficulty is that by long experience English business men have learnt the financial foibles of their Irish customers. They give long credit, and do not raise pedantic objections when the Irishman, in his easy going way, knocks off the account the odd shillings and pence. Still, here is the country peopled by farmers, dairymen and agricultural produce merchants, who, in sentiment at least, are notoriously friendly to America. Then we must remember that there is an excellent steamship service between America and Ireland, boats continually running into Queenstown in the south and Londonderry in the north from various points in America, notably the River St. Lawrence, Boston, New York and Philadelphia. Notwithstanding these facts which lie clear on the surface it is surprising that so little business is done between Ireland and America. I am inclined to think that most Americans steer clear of Ireland in the commercial sense, believing it to be "distressful," and while interesting to politicians and sight-seers, of no use to the hard-headed business man. I agree there is some foundation for this impression.

Since 1841 the population of Ireland has decreased considerably over 3,000,000. The general report on the census of Ireland issued this week as a Blue Book states that the population of the country last year was 4,458,775, or a decrease of 245,975 on the last return in 1891—a decrease at the rate of 5.23 per cent.

The numbers employed in agriculture have decreased since 1841 by 858,000 out of a total of 1,844,000, and those who may be counted as supported by agriculture by 2,500,000 out of 5,000,000. This means that agriculture has suffered in loss of labor in undue proportion to the general decrease of population, and as Ireland is essentially an agricultural country, a serious economic contraction is indicated. Taking the productive industries in the mass, in 1841 88.6 per cent. of the population depended upon them, while in 1881 this figure had decreased to 81.9 per cent., the nonproductive occupations in the meantime having risen from 11.4 to 18.1 per cent.

Charles Booth, the economist and statistician, says:

Nevertheless, the view is commonly held that in general well being Ireland has enormously improved since the famine. No evidence of this improvement is to be found in the occupation returns, which, on the contrary, point to a demoralization of industry likely to be the cause, as well as consequence, of poverty and waning trade, and certain to be the source of political discontent. I know that figures may be, and are, drawn from bank deposits and other returns which seem to tell a different story. I shall not attempt to reconcile this conflict of evidence.

#### Transit.

Ireland is fortunate in that it has a good means of transit, bearing in mind the scarcity of its population. It has railways, rivers and canals, not to mention a number of ports, so that it is evident that Americans who in the future may determine to push their interests in Ireland will not be hampered by mechanical difficulties.

In the matter of water transit it is well known that Ireland possesses a number of navigable rivers. I need only mention the Shannon, the Suir, the Blackwater, the Liffy and the Lagan. In addition are a number of canals, notably the Royal Canal, which runs east from Dublin into the Irish Midlands and in the County Fermanagh links up with the Ulster Canal, which runs from Belfast through the counties Armagh, Monaghan and Fermanagh. It is thus possible to travel from Dublin

through the Midlands of Ireland up to Belfast by water. Another canal from Dublin runs due west to Bellinashloe in the County Galway, actually cutting across the River Shannon. This grand canal in its turn links up with the Barrow Navigation, running due north and south. It is clear, therefore, that there is no difficulty in shipping goods from America to any part of Ireland.

#### Irish Banks.

Irish poverty does not connote a depletion of money. As a matter of fact on December 31, 1901, the cash balance in the joint stock banks of Ireland amounted to £42,923,000, an increase of over £12,000,000 on December 31, 1881. How far this cash balance exists for purpose of convenience, or how far it indicates money unremuneratively invested, I cannot say. In addition to the joint stock banks, which are, of course, used by the trading classes, savings banks are in great request, and particularly the Post Office Savings Bank. In 1833 the total deposits in the savings banks of Ireland amounted to £1,380,718; in 1901 the savings reached £10,629,000, of which £8,289,000 was in the Post Office Savings Bank and therefore liable to be called up within three days at any time.

#### Co-operative Credit Associations

In 1894 was started the first co-operative credit association in Ireland by the establishment of a "bank" at Doneraile, in the County Cork. Since then the number has increased rapidly, and on December 31, 1901, there were 103 of these co-operative credit banks. They are founded on the Raiffeisen system called after F. W. Raiffeisen, the creator of the loan banks which bear his name in Westphalia. The growth of these associations shows clearly enough that success is crowning their efforts, and I look in the near future to a considerable extension of this system of co-operative credit banking.

#### The Congested Districts Board.

In 1891 the Congested Districts Board was called into existence to ameliorate the conditions of life of the inhabitants of certain of the poorest districts on the western coast of Ireland. This board being a Government institution directs its efforts toward increasing the size of small holdings, chiefly by means of the amalgamation of small holdings and migration to available land, improving live stock and methods of cultivation, and by aiding and developing both directly and indirectly all suitable industries. The Congested Districts Board has been unusually successful in its work, with the result that the economic condition of the people of western Ireland has considerably improved, and of course their purchasing capacity *pro rata* increased. The small farms have been reduced in number by means of amalgamation, landlords have been bought out and the State has become the landlord, subject to subsequent purchase by the tenant. Improved methods of agriculture, horse breeding, poultry farming, fisheries, bee keeping, have all resulted from the operation of the districts board, and an indirect result is to be found in the increased prosperity of the small shop keepers of the districts affected.

#### The Other Trades of Ireland.

The next great economic change in Ireland must be to change pastoral land back to arable land and generally to cultivate the planting of crops under rotation. Pasture land, while commercially valuable to the fortunate tenant possessing it, has an adverse influence upon the welfare of the country, and the tenants of Ireland are pressing very hard for important changes. Meantime it may be remarked that on the whole Irish agriculture, especially in the east and southeast of Ireland, is in a healthy condition, and money is fairly plentiful. Enormous incomes accrue to Ireland out of its brewing industry, but in the circumstances I often doubt whether brewing has not been more of a curse than an advantage to Ireland, and of course in brewing I include distilleries. In the northeast, in Ulster, two great industries are the linen and the shipbuilding. The Dingley tariff adversely affected the Belfast linen trade, but the shipbuilding is at present in a highly prosperous condition.

#### Prospects of American Trade.

I have stated these facts so that when I tell American exporters that in the near future there is every prob-



ability of their doing good business in Ireland, it will be seen that I have a substantial basis of fact to go upon. Thanks in no small measure to the spirited exertions of Horace Plunkett, chairman of the Department of Agriculture for Ireland, in co-operation with leading Irishmen of all religions and all sides of politics, the past decade has witnessed brilliantly energetic work for the economic regeneration of Ireland. I know, as a matter of fact, that English houses are increasing their trade with that country, and are obtaining cash more readily than ever before. Fewer bad debts are made, and it is astonishing how much money is being invested in agricultural implements of all sorts. The standard of comfort in the large cities of Ireland is slowly rising with the increased purchasing capacity of the people, and this means greater opportunities for Americans who have domestic specialties to offer. The disposition is to intrust to English merchants the agency for the whole of Ireland. I am by no means convinced that this is a sound policy. There are a number of prominent importing houses in Belfast, Dublin, Cork and Waterford whose travelers cover Ireland, and who therefore may be regarded as better representative of American houses than any English concern, however large and influential it may be. If agricultural values are maintained for the next few years, the American who crosses the Atlantic and does not examine into the commercial possibilities of Ireland in his own particular line, whatever it may be, will, in all probability, be missing an exceptionally good chance. As I said at the beginning, three-quarters of Ireland is covered with the distinctively Irish race, whose sympathies are more with America than with England. I see no reason why these sympathies should not be transmitted into profit upon trade done, always providing that value be given and the personal idiosyncrasies of Irishmen be considered.

#### SPORTING GOODS WINDOW DISPLAY.

**K**IRK & SMITH COMPANY, New Castle, Pa., who are large dealers in Shelf and Heavy Hardware, Mill Supplies, &c., recently decorated their front show window in an effective way, the material used consisting of Shot Guns, Ammunition and similar Sporting Goods. In the lower left hand corner was the wax figure of a boy, Gun in hand, about aiming at a fox in the other corner of the window. The upper background was filled in with Shooting Coats, Hats and Shell Belts, the space immediately below being filled with Shot Guns, both single and double barrel. In the window near the door entrance was placed a large mirror, 60 x 100 inches, while at the other end of the display was another mirror 56 x 60 inches, so that when passing the window the pedestrian was sure to get a good display effect. In the center of the floor of the window were two small mirrors on which were placed Revolvers and Cartridges. The rest of the display was made up of Gun Cases and other Sporting Goods. The window was trimmed by Percy P. McNabb.

#### EVANSVILLE TOOL WORKS' NEW CATALOGUE.

**E**VANSVILLE TOOL WORKS, Evansville, Ind., have just published a fine catalogue of 88 pages, each 12½ x 10½ inches, illustrating and describing in a very attractive and compact way large lines of Edge Tools, Hammers, Sledges, Blacksmiths' and Miners' Tools. An effort has been made to dispense with all superfluous matter. The book is finely printed in *fac-simile* colors showing each article as ready for the market in various colored bronzes, blues, reds, yellows, greens, &c., even the stamps and labels being faithfully reproduced, so that the intending purchaser gets an instant and correct impression of the appearance of the goods. The company have added a complete line of square poll Hatchets in the different finishes to their line. They also illustrate for the first time rig builders' Hatchets, used largely by rig builders in oil districts. The arrangement of the book reflects much credit on the company.

#### THE TENK HARDWARE COMPANY'S CATALOGUE.

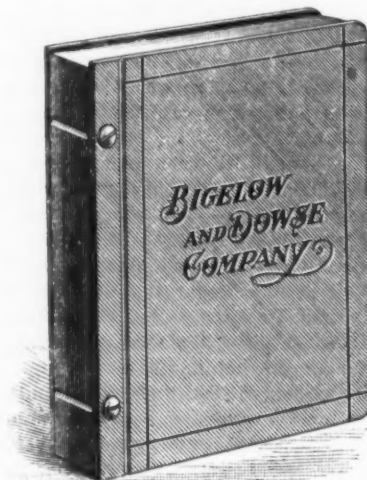
**T**HE TENK HARDWARE COMPANY, Quincy, Ill., issue a catalogue and price-list of 1059 pages bound in deep red buckram of the basket weave pattern, with morocco back, devoted to a general line of Hardware. The goods are divided into departments as follows:

Mechanics' Tools and Farming Implements.  
Builders' Hardware.  
Miscellaneous Hardware.  
Tinware, Tin Plate, Sheet Steel, &c.  
Cutlery, Razors, Shears, Silver Plated Ware, &c.  
Sporting Goods, Guns, Ammunition, &c.  
Telephones, Electric Bells, Batteries, &c.

There is also a general index of 38 pages. The catalogue is well printed on a fine quality of paper, with illustrations, descriptions and prices conveniently arranged. Some of the goods are shown in colors. This highly creditable book will no doubt be appreciated by the customers of the company. The business was established in 1865 and incorporated in 1891. A full page engraving at the front of the book gives portraits of the president and vice-president. There is also a view of the company's store and warehouse.

#### BIGELOW & DOWSE COMPANY'S CATALOGUE.

**T**HE BIGELOW & DOWSE COMPANY, Boston, Mass., have just issued a removable leaf, or adjustable binder, Hardware catalogue of over 1200 pages.



This binder permits the insertion of supplementary and extra pages in their proper places at any time. Builders' and Shelf Hardware, Mechanics' and Machinists' Tools occupy a large portion of the book. Among other lines are Ship Chandlery Hardware, Glass, Rope, Fencing, Whips, Brushes, Sleds, Skates, Sewing Machines, Cutlery, Plated Ware, Sporting Goods, &c. A number of these goods, it will be seen, indicate the marked tendency among up to date Hardware establishments to extend their lines beyond what were formerly considered legitimate goods to be included in Hardware stocks. The catalogue will be noted with interest by the trade as something of a new departure in literature issued by Hardware jobbers.

#### FRANK C. PATTEN COMPANY.

**F**RANK C. PATTEN COMPANY, Sycamore, Ill., issue two catalogues relating to their manufactures. No. 11 is devoted to Cultivators, Hay Rakes, Disk and Lever Harrows, Corn Shellers, Barrel Carts, Hand Carts, Bob Sleds, Hay Tools, &c. No. 12 relates to Hardware Specialties, Blacksmiths' Supplies, Trucks, &c. The company have recently installed a new and complete steam and electric plant with entire electrical distribution. The company are also considering the feasibility of giving their employees club facilities, such as reading rooms, baths, &c.

## KELLEY, MAUS & COMPANY'S NEW BUILDING.

**K**ELLEY, MAUS & CO., Chicago, have leased of Joy Morton, for a term of 20 years, at 6 per cent. upon the value of the land and the cost of the building, a block of ground on the West Side lying between Lake and Randolph streets on the north and south and the river and West Water street on the east and west. The contract calls for the construction of a six-story building by the owner at a cost of \$350,000. The building will be of the most modern type, covering the entire area of the block of ground, 70 x 387 feet. The exterior will be of pressed brick and the interior of steel frame work. The building will be equipped with electric elevators and electric light and fitted with every convenience to aid in the handling of merchandise. Jarvis Hunt, the architect, is now at work on the plans, and it is expected that the building will be completed ready for occupancy in six months. The building site affords fine transportation facilities, there being a network of railroad tracks on the West Water street side, with the river on the east.

### TRADE ITEMS.

SOME important changes are now taking place in the affairs of the Columbian Hardware Company, Cleveland, Ohio, and announcements will be made early in the coming year in regard to a large line of new goods to be ready at that time. We are advised that C. T. Stork has recently become a shareholder, and will have absolute management of the New York branch at 14 Warren street and of the entire Eastern business of the company. Mr. Stork is well and favorably known to the trade and will doubtless bear his increased responsibility with credit to himself and the company.

**THE R. R. HART MFG. COMPANY**, Greenville, Ohio, having secured 4 acres of ground adjoining the Pan Handle and Big Four railroads in that city, are busily engaged in the erection of suitable buildings of the following dimensions: Main building, 70 x 130 feet, three stories; finishing department, 24 x 115 feet, one story; three warehouses, 100 x 100 feet, 90 x 100 feet and 30 x 80 feet; power house, 30 x 40 feet; dust room, 20 x 30 feet, and office building, 18 x 30 feet, for the production of high grade Window and Door Screens, both stock and custom. The buildings are expected to be ready for occupancy not later than December 1, 1902, as they are well under way at the present time, so that prompt shipments may be made of orders in ample time for the coming season's trade.

**A MEETING** of the Board of Trade of Titusville, Pa., was held on the 16th inst, at which were present Messrs. Schatt, Morgan and Crouch, owners and proprietors of the Schatt-Morgan Cutlery Company of Gowanda, N. Y. The contracts between the Industrial Board directors and the gentlemen named were signed, sealed and certified. An entirely new company have been organized, in which Titusville gentlemen hold \$15,000 of preferred stock. The company intend to apply for a charter under the laws of Pennsylvania.

**H. J. MILLER'S SONS**, Bridgewater, Mass., have lately purchased the entire Tack and Nail business of the Benson Mfg. Company, 28 Conduit street, Providence, R. I. This has been removed to their well equipped plant at Bridgewater and places the concern among the largest Tack and Nail manufacturers of the country. They have also taken up the manufacture of Genuine Iron Shingle Nails, and state that they would be pleased to hear from Hardware dealers who desire a Nail which will outlast the shingles.

**WEST HAVEN MFG. COMPANY**, New Haven, Conn., formerly a partnership, are now a corporation. This has been done because their representative, Willis H. Simpson, whose office is at 90 Chambers street, New York, was desirous of acquiring an interest in the business. The capital of the old concern has not been increased. The company are manufacturers of Universal Hack Saw Blades, Power Hack Saws and Hand Frames, Utility Hack Saw Blades, Band Saws and Hand Frames, &c.

**THE RAZORINE MFG. COMPANY**, 134 Pearl street, New York, manufacturers of Razor Strops of every descrip-

tion, advise us that an injunction has been granted by Justice Steckler of the New York Supreme Court, prohibiting the manufacture and sale of any Razor Strops or Strop Dressing bearing the trade-mark Razorine or any such near resemblance thereto as to be calculated to deceive buyers. The injunction is dated October 29.

## BINDLEY HARDWARE COMPANY.

**THE BINDLEY HARDWARE COMPANY**, Pittsburgh, have made plans for the building of a very large warehouse, to be located at Shady Side Station, on the Pennsylvania Railroad. The building will be four stories in height, of steel and brick construction, and will contain 90,000 square feet of floor space. It will have direct switch connection with the main line of the Pennsylvania Railroad, and will be equipped with the most approved machinery and all possible conveniences for the handling of heavy stocks of Hardware of all kinds. The company will utilize this warehouse for the receiving and shipping of carload shipments and will carry in it very heavy stocks of goods at all times. It is also the intention of the firm to haul goods from this warehouse to their store on Seventh avenue and New Grant street by steam trucks. At present the company maintain four warehouses in different parts of Pittsburgh, but when the new warehouse is finished these will be abandoned. Work on the new building will be pushed as fast as possible.

### PRICE-LISTS, CIRCULARS, &c.

**LANSING WHEELBARROW COMPANY**, Lansing, Mich.: Catalogue No. 7, comprising 136 pages, and showing their large and varied line. The company call attention to the fact that besides Wheelbarrows, Warehouse Trucks, Hand Carts, &c., they illustrate a great many special goods not ordinarily carried in stock, and they suggest the desirability of merchants keeping the catalogue on file.

**THE COSMOPOLITAN LIGHT COMPANY**, 41-45 State street, Chicago, Ill., issue a general catalogue and also separate catalogues devoted to Mantles, Gasoline, Gas Portables and Gas Fixtures. The above company on June 1 absorbed the Chicago Solar Light Company of Kenosha, Wis., and during the latter part of October they acquired what used to be known as the old United Mantle Mfg. Company of New York, who are now doing business under the name of the Metropolitan Incandescent Light Company of New York. The Cosmopolitan Light Company have recently been reorganized with new officers and capitalized for \$1,000,000.

**AMERICAN ELECTRICAL NOVELTY & MFG. COMPANY**, 255 Centre street, New York: Illustrated catalogue, entitled "Holiday Suggestions," showing novelties operated by dry batteries, including Flash Lights, Book Lamps, Night Lights with and without clock, Alarm Clocks, Candles, Walking Canes, Cigar Lighters, Decorative and Banquet Lamps, &c., all operated by electricity.

**JOLIET MFG. COMPANY**, Joliet, Ill.: Catalogue of Joliet Spring Power Corn Shellers and Sweep Horse Powers. They also manufacture Corn Shellers of the cylinder type, which are described in a separate catalogue.

**AMERICAN ELECTRICAL HEATER COMPANY**, 195-197 River street, Detroit, Mich.: Illustrated 32-page catalogue of Soldering, Laundry and Pressing Irons, Disk Heaters or Portable Stoves, Air Heaters, Curling Irons, &c., in great variety. Also Glue and Soldering Pots, Foot Warmers, Rheostats, Shoe Ironing Tools, and Sealing Wax Heaters.

**M. S. BENEDICT MFG. COMPANY**, East Syracuse, N. Y.: A striking postal folder, enumerating some of their manufactures in Silver Plated Ware and Metal Goods, and inviting the trade to send for four new catalogues which will be forwarded express prepaid.

**COLUMBIA INCUBATOR COMPANY**, Delaware City, Del.: An attractively printed catalogue describing in much detail their line of Incubators and Brooders.

**P. & F. CORBIN**, New Britain, Conn., and 11-15 Murray street, New York: Illustrated catalogue showing in detail the Duplex 1902 model New Departure Coaster and Brake, Ramsay Swinging Pedals, Bicycle and Automobile Parts.



THE STUDEBAKER BROS. MFG. COMPANY, South Bend, Ind.: Catalogue devoted to Farm and Business Wagons, Carriages, Passenger Wagons, World Vehicles, &c. The "Studebaker Farmers' Almanac and Weather Forecast" for 1903 is also issued.

THE CHAITANOOGA PLOW COMPANY, Chattanooga, Tenn.: Catalogue devoted to Plows, Cane Mills, Evaporators, Furnaces, Sugar Kettles, &c.

THE DAVENPORT LADDER COMPANY, Davenport, Iowa: Catalogue and price-list of Single, Extension, Fire and Step Ladders, Detachable Roof Hooks, Trestle Ladders, &c. The company have just completed a new power house and an addition to their factory, which with new machinery being installed will double their capacity.

THE ZIMMERMAN MFG. COMPANY, Auburn, Ind.: Catalogue devoted to Fine Vehicles, including Buggies, Phaetons, Surreys, Runabouts, &c.

THE TALLERDAY STEEL PIPE & TANK COMPANY, Waterloo, Iowa: Catalogue relating to Galvanized Steel Tanks for storage, stock watering, cisterns, creamery, oil, gasoline, wagon, &c; Feed Cookers, Culvert Pipe, Well Casing, &c. The company have recently added to their line of goods single sheet steel Water Pipe made in lengths of 10 feet, of No. 16 steel and lighter. Selling agencies have recently been established in Denver, Col., and in El Paso and San Antonio, Texas.

THE STANDARD HORSE SHOE COMPANY, Boston, Mass.: Horse and Mule Shoes. An illustrated catalogue refers to the Shoes as being made from selected refined iron upon improved machinery and conforming in style and workmanship to the highest standard of excellence.

THE TODD MFG. COMPANY, New Albany, Ind.: Catalogue illustrating Electro-Galvanized Hames. These Hames are referred to as particularly adapted to countries where a great deal of dampness prevails.

THE ECLIPSE BUGGY COMPANY, Ft. Wayne, Ind.: Illustrated catalogue of Carriages, Buggies, Surreys, Runabouts, &c.

THE D. WILCOX MFG. COMPANY, Mechanicsburg, Pa.: Catalogue No. 6 of Carriage Hardware and Forgings, including Fifth Wheels, Gear Sets, Special Gear Irons, King Bolts, King Bolt Yokes and Braces, Shaft Couplings and Carriage and Wagon Forgings generally.

THE MANDT WAGON COMPANY, Moline, Ill.: Illustrated catalogue devoted to Farm and Market Wagons, Anti-Tip Over Oscillating Bob and Express Sleighs, Self Adjustable Bolster Springs and Specialties for Wagons and Wood Work.

THE IDEAL MFG. COMPANY, New Haven, Conn.: Booklet entitled "Hints on Loading and Reloading Shotgun Shells."

THE JOHNSON BROS. HARDWARE COMPANY, Cincinnati, Ohio: Catalogue No. 8. This contains a large line of staple and well-known goods, conveniently arranged, illustrated and described, with list prices which are all subject to a uniform discount. The catalogue thus presents over 8000 quotations and over 2000 illustrations. Very few special brands are used, nearly all of the goods covered being catalogued and sold under manufacturer's names. The catalogues are being circulated in Cincinnati and territory tributary thereto. The company sell to merchants only.

THE A. A. WOOD & SONS COMPANY, Atlanta, Ga.: Descriptive folder illustrating Wood's Hollow Auger, Fore Auger, Spoke Pointer and Spoke Shave.

THE AMERICAN MFG. & NOVELTY COMPANY, Erie, Pa.: Illustrated 1903 catalogue, devoted to Lawn Swings, Settees, Extension, Sectional, Common Straight and Step Ladders, Ironing Tables, Wash Benches, Clothes Horses, &c.

THE ALEXANDRIA HALTER MFG. COMPANY, Alexandria, Ohio: Illustrated circular devoted to Rope, Web and Leather Halters, Cattle and Horse Ties, Strap Work, &c.

THE W. H. HOWELL COMPANY, Geneva, Ill.: Catalogue and price-list illustrating Sad Irons and Sad Iron Specialties. These include Geneva and Potts' Sad Irons, Heaters, Fluters, Bird and Star Targets, Galvanized Steel Swings, &c.

## AMONG THE HARDWARE TRADE.

Justice of the Peace William H. Coward has purchased the Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods stock of Postmaster A. J. Waterman, and will continue under his own name.

Walter M. Olive, Mission, Wash., have taken possession of new quarters, which are attractively and conveniently arranged so that he is able to handle his increasing trade to the best advantage. Mr. Olive commenced in a small way about three years ago, and by keeping abreast of the time has built up a very nice trade. He has furnished most of the Hardware, Powder and other materials used in constructing the Wenatchee Canal, which is now approaching completion, and which will irrigate 10,000 acres of choice orchard land. Mr. Olive's stock comprises Heavy and Shelf Hardware, Tinware, Stoves, Sporting Goods and Agricultural Implements.

The Hardware store of S. J. W. Brown, North Loup, Neb., was entered by burglars on the 3d inst., who, after looting the store, set fire to the building, which was entirely consumed. The stock was valued at \$4000; insured for \$2500. All of the book accounts, amounting to about \$3000, were destroyed in the fire. Mr. Brown was again doing business in temporary quarters three days after the fire. He had only recently purchased the building destroyed and was doing a fine trade. He is now at work erecting a larger and more up to date structure.

Guilford Dudley has disposed of his old established business at Poughkeepsie, N. Y., to Charles D. Johnson and F. Radcliffe Williams, who will continue under the style of Johnson & Williams. Mr. Johnson, the senior member of the firm, is a grand nephew of William Henry Tallmadge, who founded the business in 1830. Mr. Tallmadge was succeeded by Elsworth & Bramen, who were in turn succeeded by Elsworth & Dudley. Guilford Dudley was successor to the latter concern, and had been in the present store for a period of 41 years. The house do both a wholesale and retail business in Shelf and Heavy Hardware, Iron and Steel and Blacksmiths' Supplies.

L. J. Hess has bought a half interest in the firm of John V. Astley & Son, Plymouth, Ind., and the style has been changed to Astley & Hess. Mr. Astley has been in the Hardware business in Plymouth for the past 20 years. Mr. Hess was formerly connected with the firm of Slayter & Hess at Argos, Ind., disposing of his interest to the Slayter Hardware Company, and has had about 18 years' experience in the Hardware line. The new firm aim to handle everything that should be found in a first-class Hardware store, including Cutlery, Mechanics' Tools, Glass, Oils, Paints, Stoves and Tinware, Pumps and Well Material, Plows, Binders, Roofing, &c.

The long established Hardware business owned by ex-Senator H. C. Groschner, Napoleon, Ohio, has been disposed of to J. L. Arnold, who has been conducting a similar business in Napoleon for a number of years, and Fred. M. Groschner, son of the former proprietor. The style of the new concern is Arnold & Groschner.

Hanson Bros., Hardware merchants, Kanawha, Iowa, have disposed of their business to J. C. Petheram, who will continue at the old stand.

Hughes & Taylor have succeeded Hughes Bros. in the retail Shelf and Heavy Hardware, Stove, Tinware and Sporting Goods business in Rexburg, Idaho.

J. M. Sprague, Hardware, Stove, Agricultural Implement and Sporting Goods merchant, Mapleton, Minn., has been succeeded by H. M. Quinn.

Mrs. M. L. Miller has succeeded Schenck & Miller, Hardware, Stove and Sporting Goods dealers, Axtell, Neb.

The firm of Johnston & Tipton, Cleveland, Tenn., have dissolved. E. C. Tipton will continue under his own name. He intends materially to enlarge the wholesale part of the business.

J. W. Ridgway has bought a half interest in the Hardware store of W. S. Lockridge, Mayfield, Ky., and the style has been changed to Lockridge & Ridgway.

Charles E. Lane, Gloucester, Mass., has disposed of his business to L. E. Smith, who has removed the stock to his own store. Mr. Smith carries on a wholesale and retail business in Shelf Hardware, Stoves and Tinware, Paints and Oils, &c., and also has a plumbing and heating department. He has recently enlarged his establishment and among other improvements has made a large wall case, 18 feet long by 8 feet high, with enough depth to accommodate his stock of tools and sell from it.

A consolidation of the interests of Carneal & Davis, Hardware merchants, and of Fritz Sitterding, contractor, Richmond, Va., is about to be effected under the style of Sitterding, Carneal & Davis Company. This company will shortly be incorporated with a capital stock of about \$100,000, paid in. The company will handle General Hardware, Builders' and Mill Supplies, Lumber, Lime and Cement, &c.

W. J. Coleman has sold his Shelf and Heavy Hardware, Stove and Tinware business in Ridgeway, Mo., to H. W. Tilbury.

### MISCELLANEOUS NOTES.

#### Portland Brush & Broom Company.

Portland Brush & Broom Company, Portland, Ind., are making all corn and rattan mixed metal case brooms, which are referred to as manufactured from the very best material and varying in weight to suit the consumer, running from 27 to 36 pounds to the dozen. Their brooms are said to contain enough rattan to protect the corn and thus stiffen the broom and greatly increase its wearing quality. The metal case protects the corn when using the broom around machinery and holds the fiber so firmly that it will not become loose on drying out. The company refer to their Quadruple Grand as especially adapted for warehouses, factories and machine shops. The company are also making push brooms for cleaning streets, sidewalks, stables, cellars, rough floors or any place where unusually heavy sweeping is to be done. These brooms are made in all sizes of bass and rattan.

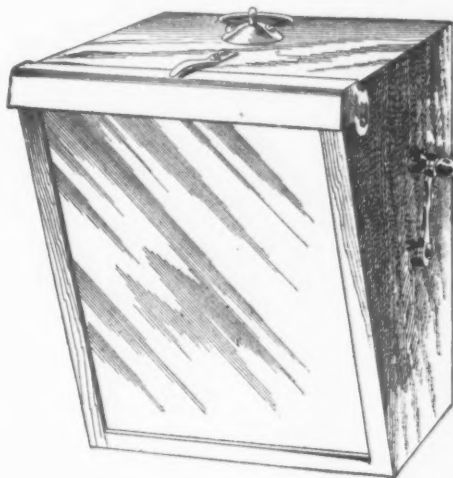
#### Opal Refrigerators.

Eureka Refrigerator Company, Indianapolis, Ind., who formerly manufactured tile refrigerators, are now lining their product with snow white opal, each section of the refrigerator being made from a single large piece of opal. It is claimed for this material that it is a perfect nonconductor, that it cannot absorb odors or moisture and that it is as cold as a stone jar. The frame is made of 2½ and 3 inch poplar wood, thoroughly seasoned and kiln dried. The oak cases have a hard oil finish, making a handsome piece of furniture. The company advise us that they are doing a large domestic business on this refrigerator and also shipping some to Europe.

#### Electric Ruby Lamp.

The American Electrical Novelty & Mfg. Company, 255 Center street, New York, have added to their large line of electrical specialties the Ever Ready electric ruby lamp for photographers, as here reproduced. The individual can have instantaneously either a ruby or white light, obtaining the latter by dropping the front of the ruby glass, back of which is a small electric light bulb, giving the ordinary electric light. The ruby plate is held in position by the hinged metal corner piece, which is kept down by the movable flat spring in the center above, the corner piece likewise serving to keep any

white light from escaping above. In the back of the lamp are the necessary dry batteries to supply the current, which is controlled by the switch at the right side of case, and the whole carried by the top center ring.

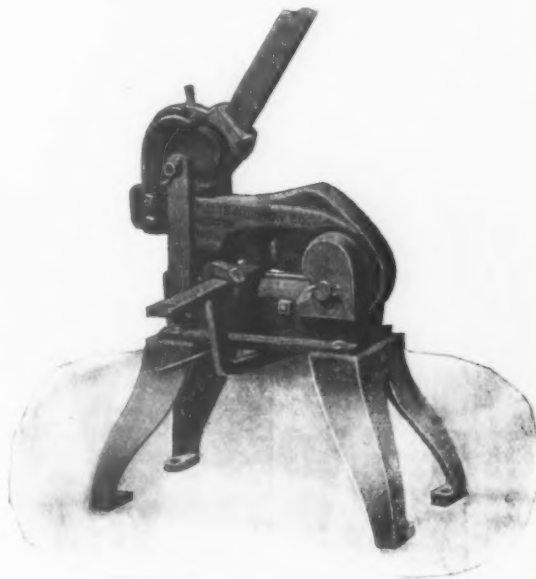


*Electric Ruby Lamp.*

The outer dimensions of the case are 3¼ inches wide, 4¼ inches high, 3 inches deep at bottom and 4½ inches deep at the top.

#### The New McLane Shear.

The Butts & Ordway Company, 190 High street, Boston, Mass., have improved their McLane shear by setting it on cast legs, as shown herewith. It is a double cut machine, made for cutting heavy iron with one side and wide thin iron with the other. The lever is brought down on the side shown in the illustration to cut thick



*The New McLane Shear.*

metal up to 3 x 5/8 and 7/8 inch round or square, and on the opposite side to cut wide thin metal up to 6 x 1/4 inch. The dies are made with four cutting edges and are interchangeable. When one edge is worn out the die may be removed and turned around, and when that edge is worn out it may be turned over, and so on until the four edges are worn out. The dies may be resharpened on any emery wheel or grindstone.

Farrand Bros. & Padden, Fredericksburg, Iowa, have disposed of their Hardware stock to Graham & Wesp, who have combined this stock with their own in a fine new store.



### Pearson Cyclone Spike Puller.

Charles Morrill, 277 Broadway, New York, has just put on the market an improved form of the Pearson Cyclone spike puller for railroad work, especially in connection with switches, guard rails, tie plates, frogs and all kinds of yard work, as well as on bridges, embankments, trestle work and in tunnels, or anywhere that the standing room of the user is limited. A spike can be pulled from any place it may be in, and the puller can be worked from either side of the track. The changes in the puller as now made are as follows: The top of the lifting rod has been cut off and two springs substituted for the one previously used, thereby saving considerable weight and centering the rod. The frame has been lightened and by a more judicious distribution of metal



Fig. 1.—Improved Pearson Cyclone Spike Puller.

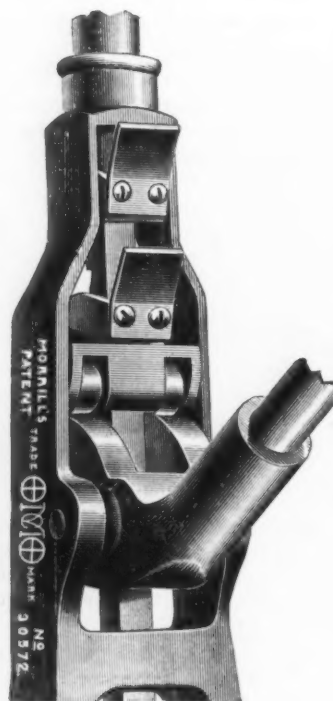


Fig. 2.—Enlarged View of Principal Working Parts.

strengthened. By discarding one of the braces it has become possible to provide a guide for the lifting rod, so that with the two guides, one at the top of the frame and the other about a foot below, any jamming of the pawls against the sides of the frame is prevented. The greatest betterment, however, is in the substitution of a rolling contact for a sliding one. The lower lifting block has been fitted with hardened steel roller bearings  $\frac{1}{2}$  inch wide, which engage with a hardened steel cam, thus reducing to a minimum the friction and wear and at the same time increasing the efficiency of the tool. In operation the tool is placed directly over a spike, when a downward movement of the lever easily raises the spike. Repeating the movement two or three times raises the spike so that usually it can be readily removed without the necessity of working the lever.

### CONTENTS.

	PAGE.
The Bignall & Keeler Double Tool Cutting Off Machine. Illustrated	11
The Kilowatt Capacity and Horse-Power of a Great City...	1
Recording Thermometer.....	1
The Union Spring & Mfg. Company.....	1
Difficulties in a Steel Mill Caused by Bad Feed Water.....	2
Gas Engines Driven by Blast Furnace Gas.....	3
The Lebanon Chain Works.....	3
Motor Driven Automatic Threading Lathe. Illustrated.....	4
The English and the American Way.....	4
The Pittsburgh Steamship Company.....	4
Scientific-Technical Notes.....	5
The American Oil Filter. Illustrated.....	6
Corrosion of Steel Frames of Building.....	7
Shenango Valley Notes.....	8
The New Barnes Sensitive Drill. Illustrated.....	8
Modern Gunmaking in New England.....	8
Notes from Mexico.....	9
The Strength of Ferroconcrete.....	9
Burning Coal Dust Without Smoke. Illustrated.....	10
Procuring Materials.....	12
United States Steel Improvements.....	13
Largest Wood Pulley Ever Built. Illustrated.....	13
Painting Structural Iron.....	13
Vacuum Casting.....	14
The Lunkenheimer Company's New Factory.....	17
Dover Furnace Revived.....	17
A Modern French Blast Furnace. Illustrated.....	18
The Status of the Cuban Reciprocity Convention.....	20
The New Chinese Tariff.....	21
The Fritz Celebration.....	22
A Most Remarkable Blast.....	25
Naval Ordnance.....	26
Iron and Coal in Scotland.....	28
The Steel Corporation's Shipbuilding Programme.....	30
Editorial:	
Price Reductions Extending.....	31
The Tribute to John Fritz.....	31
The Duty on Steel Billets.....	32
Lake Ore Matters.....	32
The Economy of High Steam Pressure.....	33
Central Pennsylvania News.....	33
The Bristol Furnace Accident.....	34
Pacific Coast News.....	34
English Production Statistics.....	35
The Standard Steel Car Company.....	35
Manufacturing:	
Iron and Steel.....	36
General Machinery.....	36
Foundries.....	36
Boilers, Engines, &c.....	37
Bridges and Buildings.....	37
Fires.....	37
Hardware.....	37
Miscellaneous.....	38
Two New Blast Furnaces at Sharpsville.....	38
The Iron and Metal Trades:	
Comparison of Prices.....	39
Chicago.....	39
Philadelphia.....	41
Cincinnati.....	41
Cleveland.....	42
Birmingham.....	43
St. Louis.....	44
The German Iron Market.....	44
Pittsburgh.....	44
New York.....	45
Metal Market.....	46
Iron and Industrial Stocks.....	46
Pittsburgh Foundrymen's Association.....	47
Obituary.....	47
The Textile-Finishing Machinery Company.....	47
Personal.....	48
The New York Machinery Market.....	48
Cleveland Molders' Strike.....	49
The Chicago Machinery Market.....	50
Boston Machinery Market.....	52
The Philadelphia Machinery Market.....	52
Trade Publications.....	54
Hardware:	
Condition of Trade.....	55
Notes on Prices.....	57
New Britain Notes.....	58
The International Axe & Tool Company.....	58
Paints in the Hardware Store.....	58a
Requests for Catalogues, &c.....	58b
Mossberg Wrench Company.....	58b
Official Changes in the De Witt Wire Cloth Company.....	58b
Notes on Foreign Trade.....	58c
Sporting Goods Window Display.....	58d
Evansville Tool Works' New Catalogue.....	58d
The Tenk Hardware Company's Catalogue.....	58d
Bigelow & Dowse Company's Catalogue. Illustrated.....	58d
Frank C. Patten Company.....	58d
Kelley, Maus & Co.'s New Building.....	59
Trade Items.....	59
Bindley Hardware Company.....	59
Price-Lists, Circulars, &c.....	59
Among the Hardware Trade.....	60
Miscellaneous Notes:	
Portland Brush & Broom Company.....	61
Opal Refrigerators.....	61
Electric Ruby Lamp. Illustrated.....	61
The New McLane Shear. Illustrated.....	61
Pearson Cyclone Spike Puller. Illustrated.....	62
Myers' New Hay Carriers. Illustrated.....	63
Corkee Corking Machine No. 39. Illustrated.....	63
Portable Combination Parlor Pool and Billiard Table. Illustrated.....	64
The Benjamin Air Rifle. Illustrated.....	64
Bernard Music Wire Nippers. Illustrated.....	64
The Warrior Gasoline Fire Pot No. 1. Illustrated.....	65
The Nason Glue Heater. Illustrated.....	65
The Clark Carriage Heater. Illustrated.....	65
The Right-Hand Power Apple Parer. Illustrated.....	66
The Chattanooga Reversible Disk Plow. Illustrated.....	66
The Simmonds Hand Saw Case. Illustrated.....	66
Taylor's Handy House Numbers. Illustrated.....	67
Ever Ready Electric Range and Gas Lighter. Illustrated.....	67
Duplex Window, Shutter and Door Fastener. Illus.....	67
Bernard Spring Punches, Parallel Jaws. Illustrated.....	68
Galvanized Steel Garbage and Factory Cans. Illus.....	68
The Lawton Steel Plate Hatchet. Illustrated.....	68
Current Hardware Prices.....	69
Current Metal Prices.....	76

### Myers' New Hay Carriers.

F. E. Myers & Bro., Ashland, Ohio, have put on the market the two new hay carriers shown herewith. In Fig. 1 is shown the hay unloader, combination, reversible, as made to use in connection with the manufacturer's regular double angle steel track, with the stop below the track. The carrier embodies all the features, it is remarked, of the straight reversible and swivel reversible carriers. It is fitted with a double lock, which engages the fork pulley on each side to insure a perfect locking device. One of the most important features of the

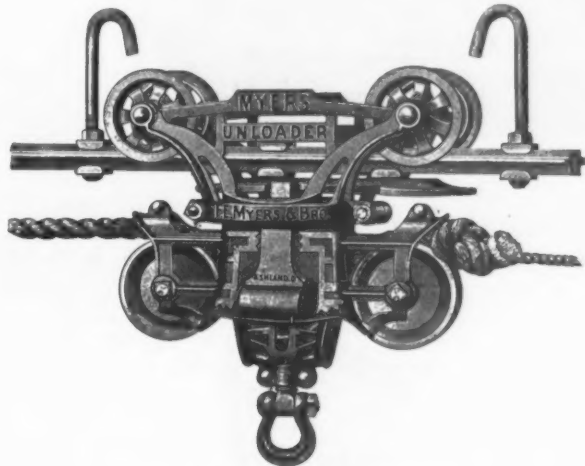


Fig. 1.—The Myers Hay Unloader.

carrier is the wide open mouth, which permits the fork pulley to enter when swinging at any angle to insure a satisfactory working carrier under any and all conditions. In Fig. 2 is given a bottom view of the unloader, with fork pulley detached. The fork pulley has an extremely short nose and is held in position by two separate locks. The rope sheaves are fitted with wide hub and have long bearings on the axle. The single rail unloader shown in Fig. 3 has the stop placed above the track. The stop is adjustable and can be placed at any point on the track without unjointing the track or disarranging it in



Fig. 2.—Bottom View of Unloader with Fork Pulley Detached.

any way. The placing of the stop above the track allows the working parts of the carrier to come up closer to the comb of the roof than the ordinary old style construction. The track is composed of a superior quality of steel, I beam in shape, with treads 2 1-16 inches wide. The head or upper bead of the track is of a shape especially adapted for attaching the stop, joint clamp and hanging hook in a firm manner, making all parts adjustable so that they can be placed at any point along the track, or be taken off individually without disarranging any of the other parts. The sections of the track are joined together by a malleable friction clamp with four bolts, to make the splice of the track as reliable as at any other point, without drilling holes or requiring

any machinery, which avoids the accumulation of remnants, as is apt to be the case when track must be cut to special length when putting up. The hanging hook is made of malleable iron, in pairs composed of two parts, so as to be taken off or put on at any point along the track without disturbing the joint clamp or any of the attachments. The machine is made of malleable iron

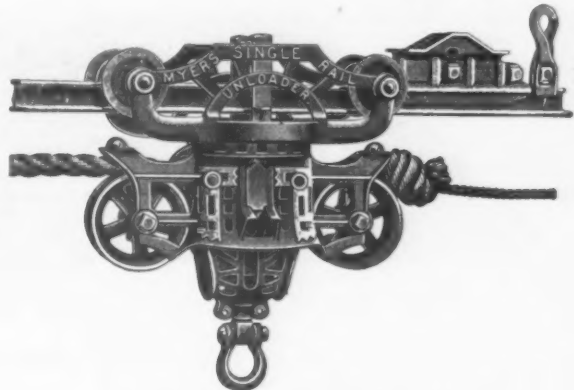
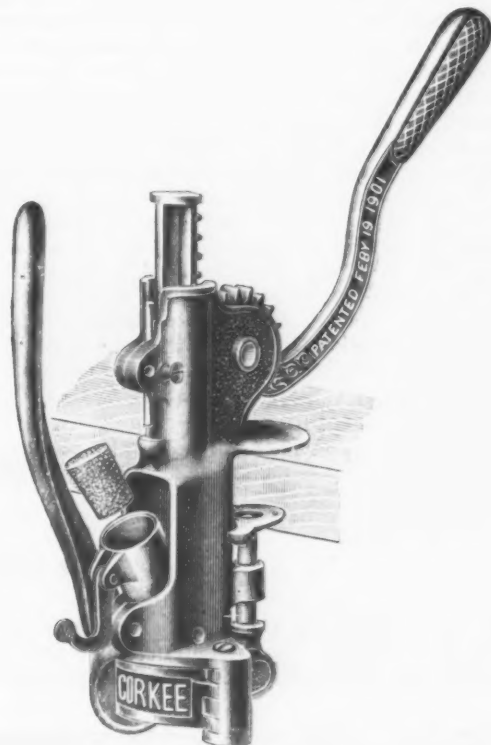


Fig. 3.—The Myers Single Rail Unloader.

throughout. The lock is composed of three pieces and is a positive force lock, grasping the fork pulley on both sides, to prevent the load being dropped under any circumstances. The carrier is fitted with large steel axles. The rope wheels have large bearings and long hub. The carrier has a large, wide mouth so as to receive the fork pulley from any direction, and so that the swinging of the fork pulley back and forward does not affect the locking device.

### Corkee Corking Machine No. 39.

The accompanying cut represents a corking machine offered by Manning, Bowman & Co., Meriden, Conn. The machine is designed for quickly corking bottles of various lengths and sizes. Corks may be driven into the



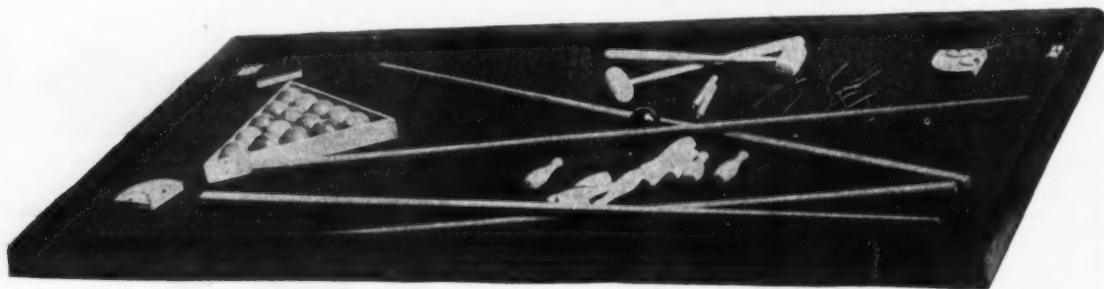
Corkee Corking Machine No. 39.

bottles at any distance required, which is accomplished by an adjusting rod, which is held in the position to produce the desired result by means of a set screw. The machine is furnished nickel plated and in black japan finish.



### Portable Combination Parlor Pool and Billiard Table.

The Carson Toy Company, South Bend, Ind., are offering the combination table shown herewith. It is 2½ feet wide by 5 feet long, strongly built and well finished.



*Portable Combination Parlor Pool and Billiard Table.*

The cabinet work is rich mahogany finish, hand polished, and the table is covered with bright green cloth, with flexible cloth covered cushions. The weight of the table, not packed, is 35 pounds. It is intended for home use and where only a limited amount of space is to be had. Being portable it can be stood up behind a door or in a closet when out of use. In use it is placed on a table that is strong and firm. Adjustable legs are provided so that the combination table can be made perfectly level. With each table is furnished a complete assortment of billiard, pool and croquet balls, pocket covers, ten pins, mallets, arches, stakes, cues, triangle, chalk and everything necessary for the 20 games that may be played on the table. A book of instructions telling how to play the different games accompanies each table.

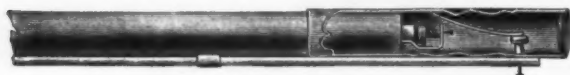
### The Benjamin Air Rifle.

The accompanying cuts represent improvements in the air rifle of the Benjamin Air Rifle Company, 212 N. Main street, St. Louis, Mo. The valves have been improved and are more durable. The pump and air chamber can now be separated, exposing the valves so as to make them easy to repair or replace. The gun is charged by means of an air pump, which extends from the muzzle to the band. The air chamber into which the air is compressed is located between the band and the breech, while the barrel is beneath the pump and is attached to it. When the trigger is pulled a valve within the air chamber rushes out through the barrel, driving the shot before it. It is pointed out that there is no jump or recoil when the gun is discharged and that the bullet travels the entire length of the barrel, which gives it great accuracy. The rifle may be charged light or heavy, as desired, or according to the strength of the operator. It can be charged heavily enough to kill rats, rabbits and all small game. The gun may be uncoupled, to take it down, by removing the thumb nut. Among the points of excellence claimed for the gun



*Fig. 1.—The Benjamin Air Rifle.*

are the following: That it cannot be accidentally discharged, as it has no catch and nothing but a pull upon the trigger will discharge it; that a blow or jar will not



*Fig. 2.—Valves of Air Rifle.*

discharge it, though it be thrown upon the ground, and that there is no lever to fly back and crush or cut the fingers. The rifle is 32 inches long and weighs 2 pounds. It shoots B B shot and the rear sight is adjustable.

### Bernard Music Wire Nippers.

The accompanying illustration shows the Bernard music wire cutting nipper made by the William Schallhorn Company, New Haven, Conn.; New York office in charge of Willis H. Simpson, 90 Chambers street. The

compound system of leverage gives the tool great power, its extreme length being 5¼ inches; jaws, ¾ inches



*Bernard Music Wire Cutting Nippers.*

wide. This nipper is especially intended for cutting high grade music wire, both jaws having serrated edges to keep the peculiarly hard, tough wire from slipping

along the jaws while in the process of cutting, each jaw having eight small notches or grooves for that purpose. In each handle about the center of the tool is a small spiral steel spring. The nippers are polished and nickel plated and the parts are interchangeable, extra parts being obtainable in the event of injury.

F. E. Jackson has purchased the Carver Hardware stock in Angola, Ind. Mr. Jackson will carry on the business at the old stand until the premises adjoining his present store are vacated, when he will move the Carver goods to that point, thus combining the two stocks.

### The Warrior Gasoline Fire Pot No. 1.

Phillips & Harmon, Northville, Mich., are putting on the market the fire pot shown in Fig. 1, for use by tinners and plumbers. The burner is a solid brass casting with a sheet iron top, which is cut from a scrap of iron. A new top for the burner can be cut and sprung into



Fig. 1.—The Warrior Gasoline Fire Pot No. 1.

position by any mechanic in less than two minutes, it is explained, and it can be instantly removed with the bare hand. This, it is remarked, is the only part of the burner to wear out, and can be replaced for less than one-eighth of a cent. The generating capacity of the burner consists of over 12 linear inches, which is referred to as an unusual generating capacity, and as supplying the greatest quantity of gas with the least possible gasoline. The heat can be regulated from intense to minimum. It is stated that every angle is arranged so as to be cleaned easily and quickly, yet so perfectly constructed as to re-

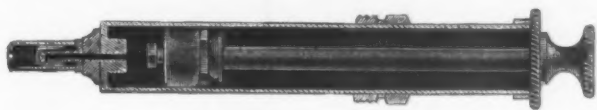


Fig. 2.—The Phil-har Pump.

quire little attention in this direction. All burners are guaranteed to be constructed perfectly and are inspected and tested before leaving the factory. The pump used in connection with the pot, shown in Fig. 2, is made of brass, simple in construction and direct in action. All working parts are incased. If desired an air valve and rubber bulb can be procured at a slight additional expense in connection with the pump, or without additional cost if they are preferred to the pump. The top of the pot consists of a malleable iron frame and bottom and

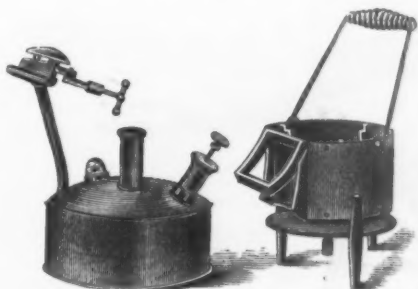
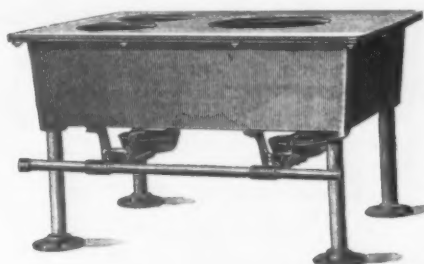


Fig. 3.—The Burner Bottom Side Up.

heavy sheet iron sides and bottom, leaving an air chamber between the malleable and sheet iron bottom, with the fire above both so as to prevent the gasoline in the tank becoming overheated. The top is easily removed by taking out a cotter pin, so as to be of service in thawing a frozen pipe, melting heavily soldered pipe or doing any other work where it is necessary to apply intense heat to any given point. The burner, after generating, will work equally as well either side up and the swivel joint enables it to be operated in a variety of positions. In Fig. 3 the burner is shown in operation, bottom side up, for thawing pipes and other classes of work of a similar nature.

### The Nason Glue Heater.

The accompanying illustration represents a heater put on the market by the Nason Mfg. Company, 71 Fulton street, New York, for heating glue, paste, &c., in which gas is employed as the heating agent. The heater is manufactured in three sizes, and each size can be furnished with covers carrying various combinations of pots in sizes from 5 to 12 inches in diameter. The burners used are referred to as of the most approved design. Tests made, it is pointed out, have shown a high heating efficiency with an economical gas consumption. Each heater is furnished with iron pipe legs of proper height for bench use, or they may be equipped with legs of proper length for the heater to stand on the floor, when required. Where steam is not



The Nason Glue Heater.

available the utility of the heater, it is remarked, will be readily appreciated. A booklet describing the gas heater, as well as the Nason steam glue heater, will be furnished upon application to the manufacturers.

### The Clark Carriage Heater.

The Chicago Flexible Shaft Company, Chicago, Ill., have improved their carriage heaters, as shown herewith, by using stamped steel in their manufacture instead of iron, as formerly. It consists of a metallic case, oval in shape, covered with brussels carpet, in either green or blue, to match carriage linings. The case is provided with a perforated box or drawer working in a metallic slide and is held in place by a spring. Into the drawer is placed a piece of prepared coal, shown below the heater in the illustration. This is known as the Clark coal, which burns, it is explained, without soot, smoke or odor, from 12 to 15 hours. The coal is prepared by a special process and is formed



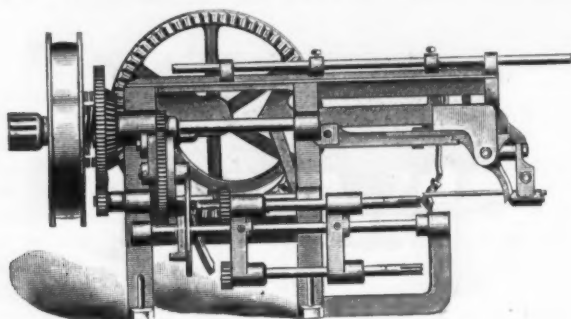
The Clark Carriage Heater.

into briquettes  $7\frac{1}{4} \times 2\frac{1}{4} \times 1\frac{1}{4}$  inches, under a hydraulic press exerting a pressure of 150 tons to the square inch, after which all gases are driven out by subjection to high temperature. After the coal is placed in the heater combustion is not visible. The manufacturers remark that the heater, placed in a sleigh or carriage, will keep the feet warm and comfortable even in the coldest weather.



### The Right Hand Power Apple Parer.

The Goodell Company, Antrim, N. H., New York office, 10 Warren street, have put on the market the right hand feed apple parer, shown herewith. The reel which carries the three forks is formed of two members located upon the central reel shaft, this shaft being carried at each end in ample bearings. This permits close alignment of the spindle with the coring mechanism and the use of a long fork spindle. The reel drive, index and locking disk are arranged to obtain a slow start with increasing speed for the reel motion, to prevent jar and shock. The drive pulley is double flanged so that where a quarter turn belt is used it will not run off. A con-



*The Right Hand Power Apple Parer.*

cealed clutch is used, on the parer, leaving no part exposed. This is quickly and easily operated. By unhooking a spring the knife bar and head may be removed without danger of derangement of these parts when in use. Throughout the construction of the machine the aim has been to secure ample strength, great durability, ease of operation and simplicity. It is remarked that by the use of heavy parts, large shafts and bearings, the best materials and machine work, these results have been fully accomplished.

### The Chattanooga Reversible Disk Plow.

The Chattanooga Plow Company, Chattanooga, Tenn., are offering the reversible disk plow, shown herewith, which, it is claimed, works equally well on hillsides and level land. When turning corners only the team and disk revolve, leaving the frame stationary. It is as



*The Chattanooga Reversible Disk Plow.*

though the team was unhitched from one end of the plow and rehitched at the other end, thus plowing backward and forward. The plow is guaranteed by the makers to do good work not only in hard, dry and sticky ground, but in any fallow ground, either clean or trashy. The plow can be used right or left hand, plowing around the land; or reversible, throwing furrows all one way. It will plow between terraces, it is explained, without leaving a water furrow. The plow is referred to as simple in design, few in parts and durable and perfect in construction.

### The Simonds Hand Saw Case.

The accompanying illustrations represent the manner in which the Simonds Mfg. Company, Fitchburg, Mass., are now packing hand saws. By the arrangement of having each saw in a separate case a saw, when sold, is



*The Simonds Hand Saw Case.*

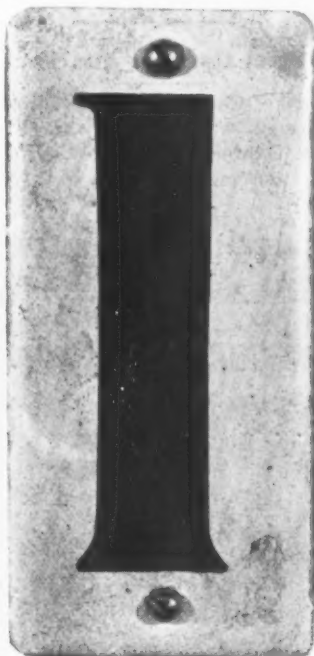
ready to hand to a customer without any further doing up. The cases are so marked with the size of the saw, number of points to the inch and whether it is rip or

hand that this information shows plainly on the case, no matter how the cases are placed on the shelf. By arranging the saws handle and point they will pack squarely and evenly on the shelves. We are advised that merchants whose attention has been called to this idea of packing hand saws appreciate the advantages of the innovation.

E. J. Ferenkamp has disposed of his Hardware, Stove and Sporting Goods business in Marysville, Kan., to Custard Bros., who intend to add materially to the stock.

### Taylor's Handy House Numbers.

A. V. Taylor & Co., 1056-1058 Central avenue, Cincinnati, Ohio, are manufacturing Taylor's handy house numbers here illustrated. They are made of sheet metal with blue or black numbers on a white enameled background, in individual numbers so that any desired group may be assembled to indicate the street number of a



Taylor's Handy House Numbers.

house in any number of figures. They are usually retailed at 10 cents each, which allows a large margin of profit for the dealer, whether ordered through a jobber or direct from the manufacturer. This concern also manufacture enameled steel signs for intersections of streets, for coal wagons, railroad depots, telegraph and telephone stations, laundry agencies and kindred purposes. They also make a variety of swing signs in Venetian iron, either with lettering on or for sign painters, who letter them in gold leaf or other material themselves.

### Ever Ready Electric Range and Gas Lighter.

One of the more recent and practical every day articles among a large number of electrical specialties made by the American Electrical Novelty & Mfg. Com-



Ever Ready Electric Range and Gas Lighter.

pany, 255 Centre street, New York, is the Ever Ready electric range and gas lighter, No. 93, the practical application of which is indicated in the accompanying illustration. This lighter is 16¼ inches long over all, the handle containing a dry battery 9¼ x 1½ inches in dimensions. In use a pressure of the thumb closes an inner circuit and causes a glow in the perforated tube which in contact with gas from a burner of any character ignites it while the individual is at a safe distance from explosions of an incipient character sometimes caused by too great an escape of gas caused by carelessness in handling. The battery is said to have a capacity of 1500 lights before renewal is necessary, when a new battery

can be slipped into position at a retail cost of 25 cents. It is especially suitable for igniting gas ranges, gas stoves, gas heaters and gas burners. The manufacturers emphasize the point that as they have been making goods of this general character for five years they have become staple and standard and long past the experimental stage.

### Duplex Window, Shutter and Door Fastener.

The Dub Specialty Company, Cincinnati, Ohio, are introducing the window, shutter and door fastener here illustrated, it being a device to guard against entrance through windows, doors, shutters, transoms or screens. The fastener is a highly tempered, nicked steel shank with an arm at each end extending at right angles and two small sockets into which the arms fit when placed in position. A hole is bored in the sash about 1 foot from the top of the lower sash and on either side, about ½ inch from the casing, in which one of the brass sockets is inserted to receive an arm of the fastener. A corresponding hole is bored in the window frame at an ap-



Duplex Window Shutter and Door Fastener.

propriate point indicated by the length of the device, in which the second socket and remaining arm of the shank is inserted to secure the window, the sockets always remaining in position. To release the window one of the arms is withdrawn from the socket, when the window may be raised and lowered as desired. By placing additional sockets in sash or frame at various points the window may be secured at any given point. When used as a shutter fastener a larger size is provided. The fastener is placed level on the window sill at the middle immediately under the lower sash. A small hole nearly the size of the socket is made in the rabbet of the outside shutter in line with the projecting arm of the

fastener, into which one of the brass sockets is forced. The end of the fastener is then placed in the socket, thus securing both shutters. At a point in the sill half way between the inner and outer edge of the lower sash a second hole is bored in which an additional socket is forced to receive the inner arm of the fastener. An incision is made in the underside of the lower sash like an inverted V, extending from the outer edge to the center, so that the sash will fit over the fastener and imbed it when the window is closed. There are no disfiguring screws, nails or bolts used, and the fasteners may be applied to any window, new or old. The use of this fastener prevents the rattling of shutters or windows from



the action of wind or other causes, and they are said to withstand almost any pressure or force likely to be brought against them.

### Bernard Spring Punches, Parallel Jaws.

The William Schollhorn Company, New Haven, Conn., represented in New York by Willis H. Simpson, 90 Chambers street, where a complete line of samples is



Fig. 1.—Bernard Single Tube Spring Belt Punch.

carried, have recently put on the market two new Bernard belt punches, as here illustrated, supplementing a large line of pliers and punches made on somewhat similar lines for a great variety of purposes. Fig. 1 is a spring punch 7 inches long, with high grade finely tem-

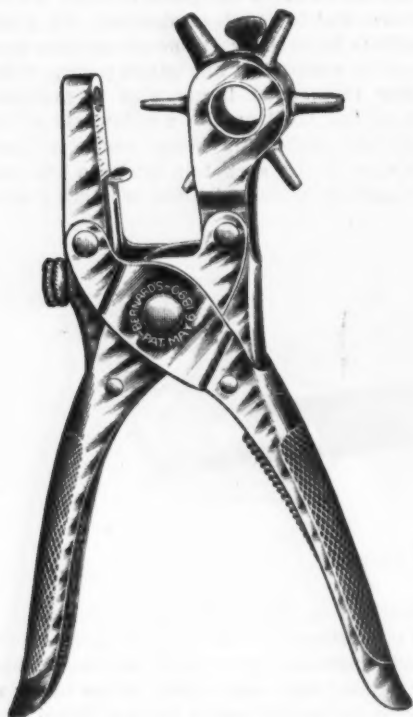


Fig. 2.—Bernard Revolving Six-Tube Spring Belt Punch.

pered screw tube, which can be renewed as needed or changed for tubes larger or smaller as occasion requires. The sliding gauge has a range of  $1\frac{1}{4}$  inches from center of tube, the tube cutting against a brass bed which is regulated by an oval head screw underneath. Fig. 2 il-

lustrates the Bernard revolving belt punch, having six similar screw tubes in sizes 2, 4, 6, 8, 10 and 12. This punch is an 8-inch size and has an adjustable gauge graduated by sixteenths to  $1\frac{1}{8}$  inches. The punches are revolved by raising slightly a semicircular spring plate on the reverse side. The manufacturers warrant both punches as made of crucible tool steel. Both have open throats, parallel jaws and are full nickeled.

### Galvanized Steel Garbage and Factory Cans.

The Steel Basket Company, Cedar Rapids, Iowa, are offering the cans shown herewith. These are so made that corrugation is braced separately, by special machinery designed by the company. The cans are referred to

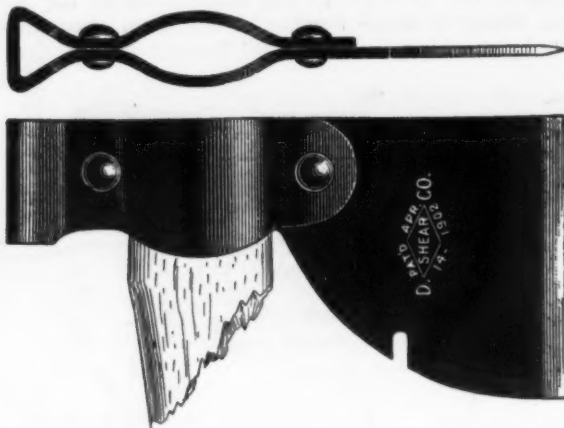


Galvanized Steel Garbage and Factory Cans.

as being stiff, strong, durable, light in weight and easily handled. The fact that they nest closely is alluded to as resulting in low freight rates and as saving in storage space.

### The Lawton Steel Plate Hatchet.

The Diamond Shear Company, Wilmington, Del., are offering the one-piece steel plate hatchet, shown in the accompanying cuts, the steel being bent and riveted to form the head and eye. A notch is cut in the head, corresponding to the location of claws on a hatchet, by means



The Lawton Steel Plate Hatchet.

of which nails may be pulled. The hatchets are described as made of high carbon steel, tempered, and are offered at a moderate price. They are made in No. 2 size, in two finishes; polished bit, the rest being japanned, and in all black except the swaged edge.

Willoughby & Hasse, Maple Rapids, Mich., have bought the Hardware stock of Lawe & Redfern. The latter have gone into the Agricultural Implement business, having acquired the stock formerly carried by Parr & Gamble.